ORDER NO. HAD8604488C9

Service Manual

Tuner

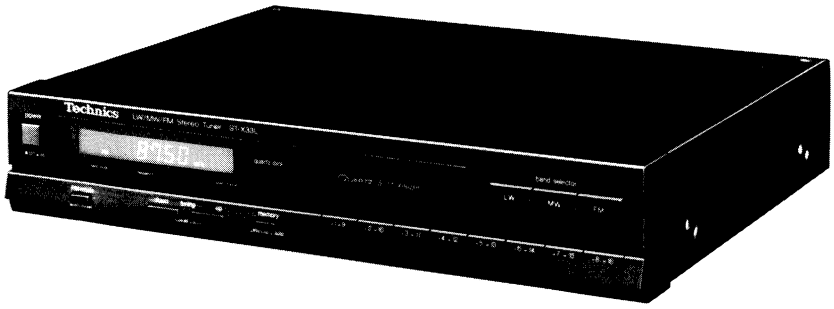
QUARTZ Synthesizer AM/FM Stereo Tuner
(ST-X33)

QUARTZ Synthesizer LW/MW/FM Stereo Tuner
(ST-X33L)

ST-X33
ST-X33L

Color

(K)...Black Type



* This photo is **ST-X33L**.

Color	Areas
(K)	[EX]....Continental Europe. (ST-X33L)
(K)	[EK]....United Kingdom. (ST-X33L)
(K)	[EB]....Belgium. (ST-X33L)
(K)	[EH] ...Holland. (ST-X33L)
(K)	[EF]....France. (ST-X33L)
(K)	[XA]....Asia, Oceania, Latin America, Middle Near East and Africa. (ST-X33)
(K)	[XL]....Australia. (ST-X33)
(K)	[PC]....European Audio Club. (ST-X33)

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz (0.05 MHz step)
Sensitivity	1.5 μV/75Ω (IHF '58)
S/N 30 dB	1.3 μV (75Ω)
S/N 26 dB	1.2 μV (75Ω)
S/N 20 dB	0.9 μV (75Ω)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB, IHF '58)
STEREO	65 dB (71 dB, IHF '58)
Frequency response	20 Hz~15 kHz, +0.5 dB~−1.5 dB
Alternate channel selectivity	
normal ±400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	40 dB
IF rejection at 98 MHz	70 dB
Spurious response rejection at 98 MHz	70 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75Ω (unbalanced)

■ AM (MW) TUNER SECTION

Frequency range	
(For Europe and Australia)	
	522~1611 kHz (9 kHz-steps)
	530~1620 kHz (10 kHz-steps)
(For Saudi Arabia and others)	531~1602 kHz (9 kHz-steps)
	530~1600 kHz (10 kHz-steps)
Sensitivity (S/N 20 dB)	20 μV, 300 μV/m
Selectivity (±9 kHz)	55 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ LW TUNER SECTION (ST-X33L only)

Frequency range	155~353 kHz
	153~351 kHz (−2 kHz shift)
Sensitivity (S/N 20 dB)	50 μV
Selectivity at 254 kHz	55 dB
Image rejection at 254 kHz	40 dB
IF rejection at 254 kHz	60 dB

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	6W
Power supply	AC 50Hz/60Hz, 8.6V
Dimensions (W×H×D)	315×60.5×248mm
Weight	1.5kg

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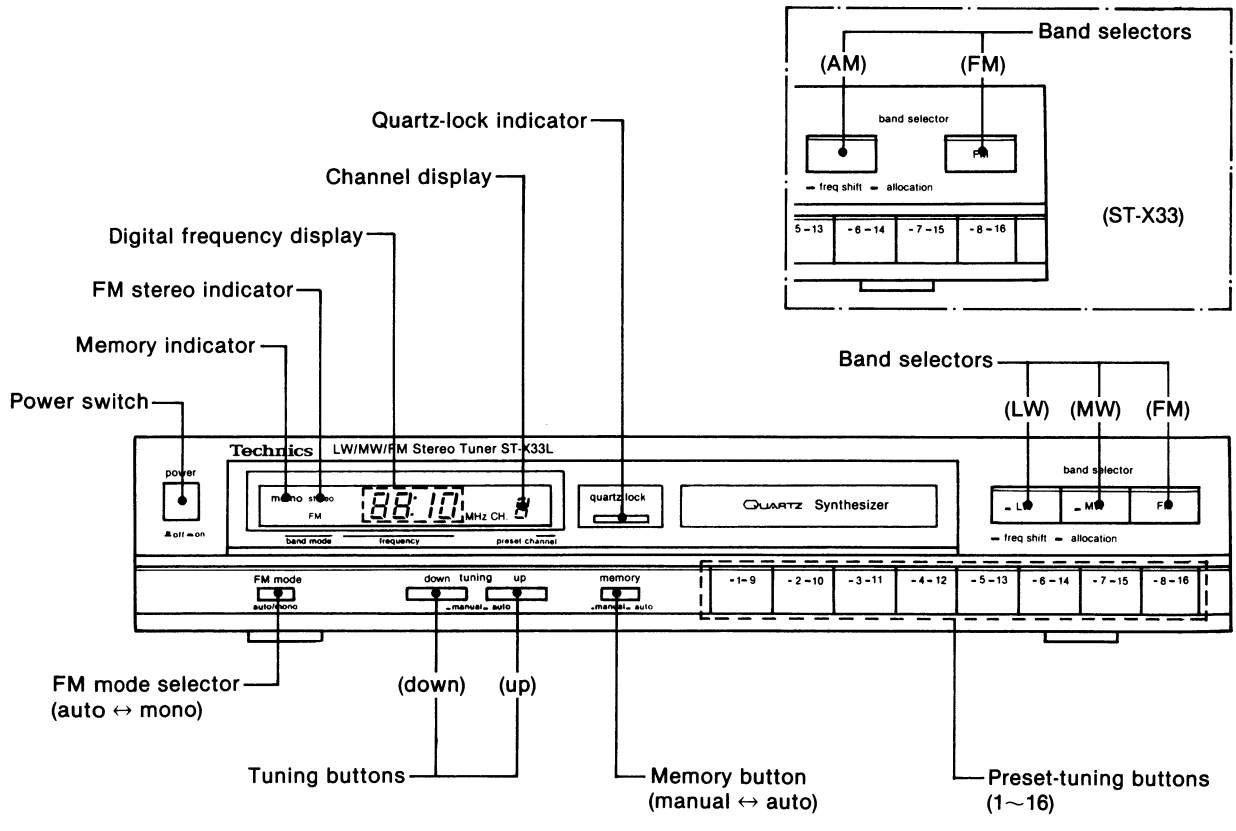
■ LOCATION OF CONTROLS

- **Front panel (ST-X33L)**



ORDER NO. HAD8604488C9-A

QUARTZ Synthesizer
AM/FM Stereo Tuner
QUARTZ Synthesizer
LW/MW/FM Stereo Tuner

ST-X33
ST-X33L

DEUTSCH

■ MESSUNGEN UND JUSTIERUNGEN

AM/FM (ST-X33)
LW/MW/FM (ST-X33L)

Einstellungen der Bedienelemente und zu verwendende Geräte.
- MW/UKW-Meßsender (MW/UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analystator
- Oszilloskop
- Elektronische Wechselstrom- und Gleichstrom-Voltmeter (EVM).
- Frequenzzähler
- Drosselspule (100µH)
- Widerstand (100kΩ)
- Keramischer Kondensator (200pF)

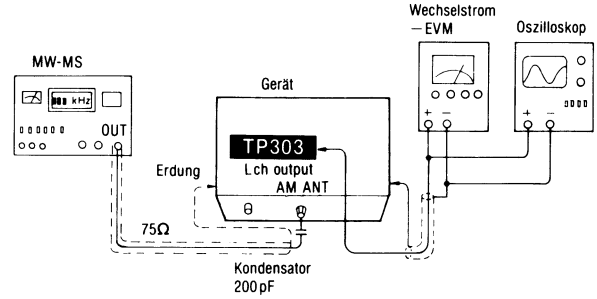
Anmerkung: Für **T201 (AM ZFT)**, **L204 (AM (MW)-OSZ,-Spule)** und **L205 (LW-Antennenspule)**, werdeven justiert Ersatzteil geliefert.
Dien Kern dieses Teils daher nicht drehen.

AM (MW)-HF-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**AM (MW)**" einstellen.
3. Radio und Signalgenerator auf **612kHz** einstellen.
4. **L205 (AM)**, **L203 (MW)** auf maximale Ausgangsleistung abgleichen.
5. Radio und Signalgenerator auf **1503kHz** einstellen.
6. **CT202 (AM)**, **CT201 (MW)** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3.~6. wiederholen.

Anmerkung:
Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

ZUSTAND DES MW-MESSENDERS
Modulation..... 30%
Modulationsfrequenz..... 400Hz

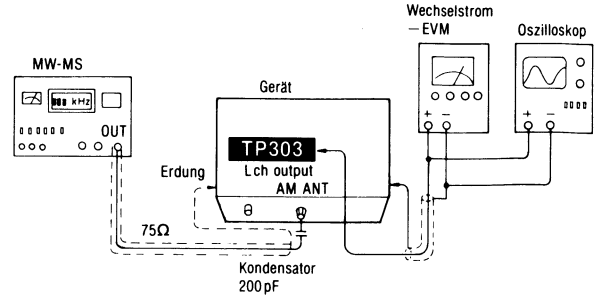


LW-HF-JUSTIERUNG (Nur ST-X33L only)

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**LW**" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **155kHz** einstellen.
4. **L206** auf maximale Ausgangsleistung abgleichen.
5. Die Radiofrequenzanzeige und den Meßsender auf **353kHz** einstellen.
6. **CT202** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3.~6. wiederholen.

Anmerkung:
Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

ZUSTAND DES MW-MESSENDERS
Modulation..... 30%
Modulationsfrequenz..... 400Hz



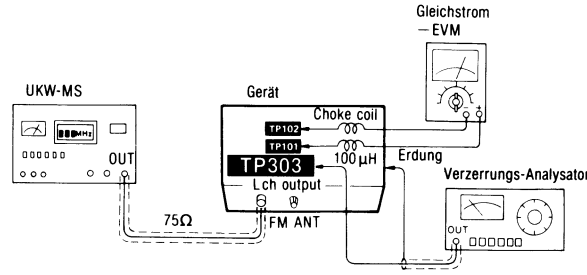
UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**FM (UKW)**" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **100.10 MHz** einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0 mV (0±50 mV)** im 1 V-Bereich beträgt.
5. **T102** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Überprüfen, daß die Verzerrungsfaktor des linken und rechten Kanals fast gleich sind.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

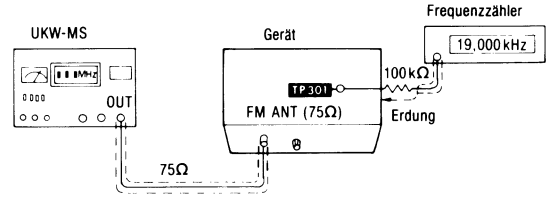
ZUSTAND DES UKW-MESSENDERS
Modulation..... 100%
Modulationsfrequenz..... 400 Hz
Ausgangspegel ..... 66 dB



MPX-SGO-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Bertriebsart-Wahlschalter indie "**FM/auto**"-Position stellen.
3. Radio und Meßsender auf **100.1 MHz** einstellen.
4. **VR301** auf **19 kHz±50 Hz** auf der Frequenzzähleranzeige justieren.

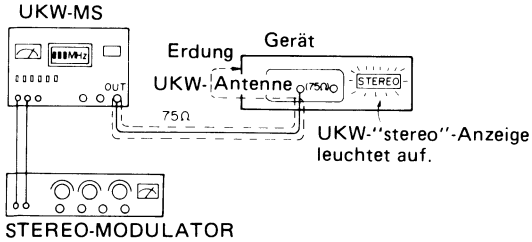
ZUSTAND DES UKW-MESSENDERS
Modulation..... 0
Modulationsfrequenz..... 0
Ausgangspegel ..... 66 dB



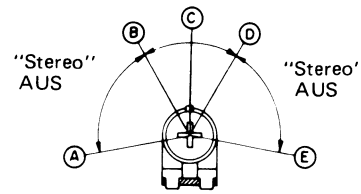
★ VERWENDUNG EINES ALTERNATIVSYSTEMS

1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. **VR301** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR301** mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS
Modulation..... 10%
Modulationsfrequenz... Pilot (19 kHz)
Ausgangspegel..... 66 dB



STEREO-MODULATOR
Pilotsignal auf ON..... 19 kHz
Ausgangs-Betriebsart.... L + R



VR301

Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... "Stereo"-AUS-Position.
Ⓑ–Ⓓ..... "Stereo"-EIN-Position.
(Anzeige Leuchtet)
Ⓒ..... Punkt der Pilotschaltung justieren.

ORDER NO. HAD8606561S2

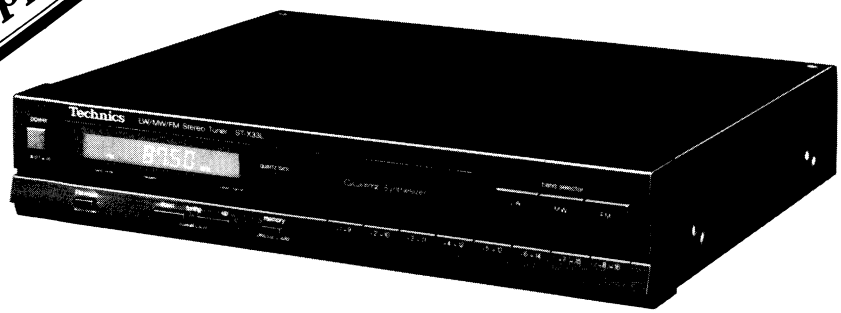
Service Manual

Supplement

QUARTZ
Synthesizer LW/MW/FM Stereo Tuner

Tuner
ST-X33L

ST-X33L



Color

(K)...Black Type

Color	Area
(K)	[EG] ...F.R Germany.

• Please use this manual together with the service manual for model No. ST-X33/X33L order No. HAD8604488C9.

TECHNISCHE DATEN

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz (0,05-MHz-Schritte)
Eingangsempfindlichkeit	1.5 μV/75Ω (IHF '58)
S/R 30 dB	1,3 μV (75 Ω)
S/R 26 dB	1,2 μV (75 Ω)
S/R 20 dB	0,9 μV (75 Ω)
Stereoumschaltschwelle bei 46 dB nach IHF	28 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF '58)
Stereo	65 dB (71 dB nach IHF '58)
Frequenzgang	20 Hz ~ 15 kHz (+0,5 dB ~ −1,5 dB)
Trennschärfe bei Störsender	
normal ±400 kHz	70 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	90 dB
ZF-Dämpfung bei 98 MHz	90 dB
Ansprechdämpfung auf	
Nebenfrequenzen bei 98 MHz	100 dB
MW-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	40 dB
Trägerrest	
19 kHz	−70dB (−80dB nach IHF)
38 kHz	−75dB (−80dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,2 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9-kHz-Schritte)
	530 ~ 1620 kHz (10-kHz-Schritte)
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe (±9 kHz)	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	40 dB
ZF-Dämpfung bei 999 kHz	60 dB

■ LW-TUNERTEIL

Wellenbereiche	155 ~ 353 kHz
	153~351kHz (−2kHz Schaltung)
Eingangsempfindlichkeit (S/R 20 dB)	50 μV
Trennschärfe bei 254 kHz	55 dB
Spiegelfrequenz-Dämpfung bei 254 kHz	40 dB
ZF-Dämpfung bei 254 kHz	60 dB

■ ALLGEMEINE DATEN

Ausgangsspannung	0,6 V (1,0 V, IHF)
Leistungsaufnahme	6 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 8,6 V
Abmessungen (B×H×T)	315 × 60,5 × 248 mm
Gewicht	1,5 kg

Bemerkung:

Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

(Die technischen Daten können infolge von Verbesserungen ohne Ankündigung geändert werden.)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ MEASUREMENTS AND ADJUSTMENTS (ADDITION)

Addition

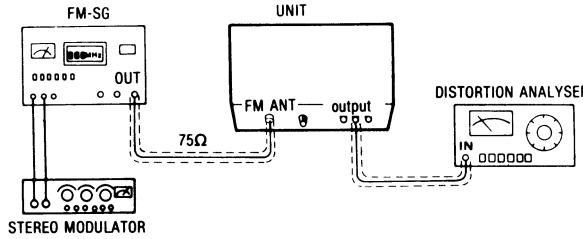
Note: For **T201 (AM-IFT), L204 (AM (MW) OSC coil), L205 (LW ANT coil), L301, L302 (19kHz L.P.F) and L303 ("Antibirdy"-Filter)**, adjusted parts are supplied. So, do not turn the cores of this parts.

Addition

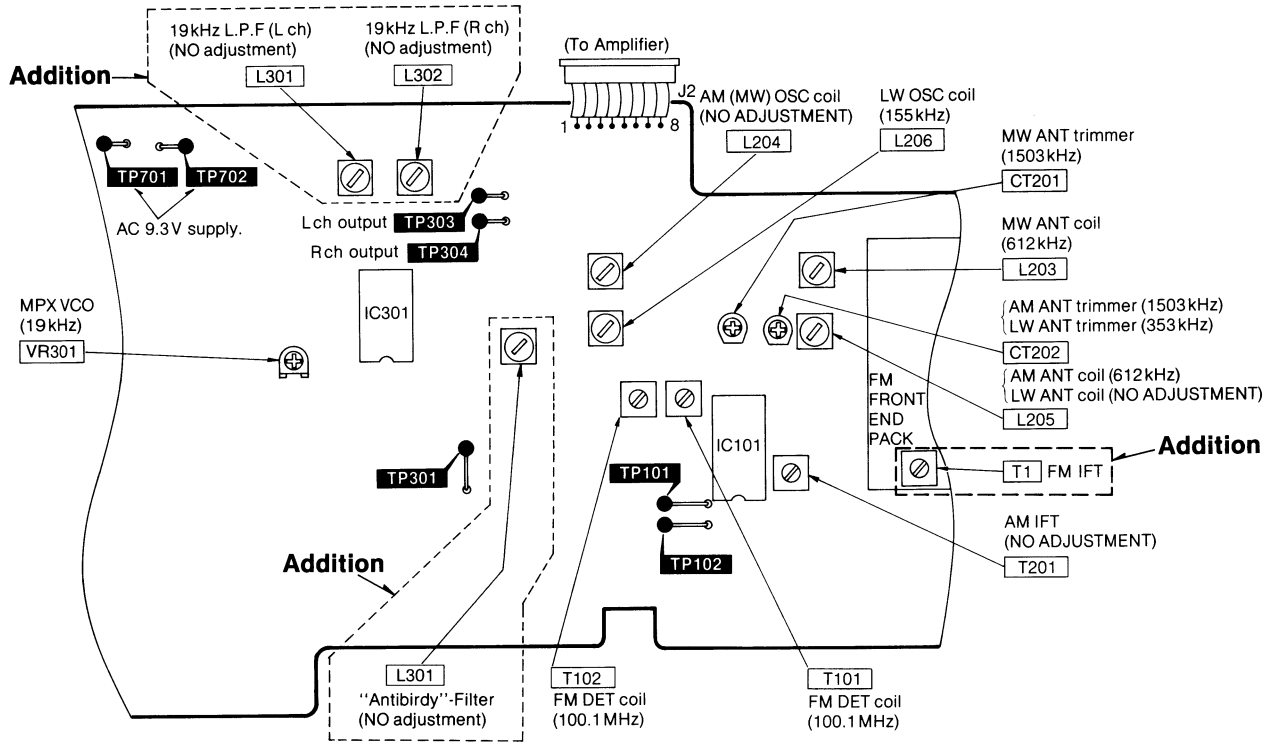
FM IFT ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit into "**FM on/auto**" position. (by FM mode select button.)
3. Place the radio frequency display and signal generator setting to **101.1MHz.**
4. Adjust **T1** so that distortion factor of Lch. is minimized.
5. Make sure that the distortion factors of Lch. and Rch. are Rch. are at minimum and nearly equal.

FM SIGNAL GENERATOR CONDITION
Modulation.....90% (Pilot 10%)
Modulation frequency.....L mode 400Hz (Pilot 19kHz)
Output level.....66dB



• Adjustment points



■ RESISTORS AND CAPACITORS

Notes: • Part numbers are indicated on most mechanical parts. Please use this part number for parts order.

- The unit of resistance is OHM (Ω). K=1000Ω, M=1000kΩ
- The unit of capacitance is MICROFARAD (μF). P=10⁻⁶μF.

● CAPACITORS

Ref. No.	Part No.	Value
C101	ECKD1H103ZF	0.01
C102	ECCD1H330KC	33P
C103	ECKD1H103ZF	0.01
C104, 105	ECCD1H101K	10P
C107	ECEA1HU010	1
C108	ECEA1HUR47	0.47
C109	ECKD1H103ZF	0.01
C110	ECEA1CU100	10
C112, 113	ECKD1H223ZF	0.022
C114	ECKD1H103ZF	0.01
C116	ECEA1HU2R2	2.2
C201	ECFTD473KXL	0.047
C202	ECKD1H223ZF	0.022
C203	ECCD1H180KC	18P
C204	ECQP1471JZ	470P

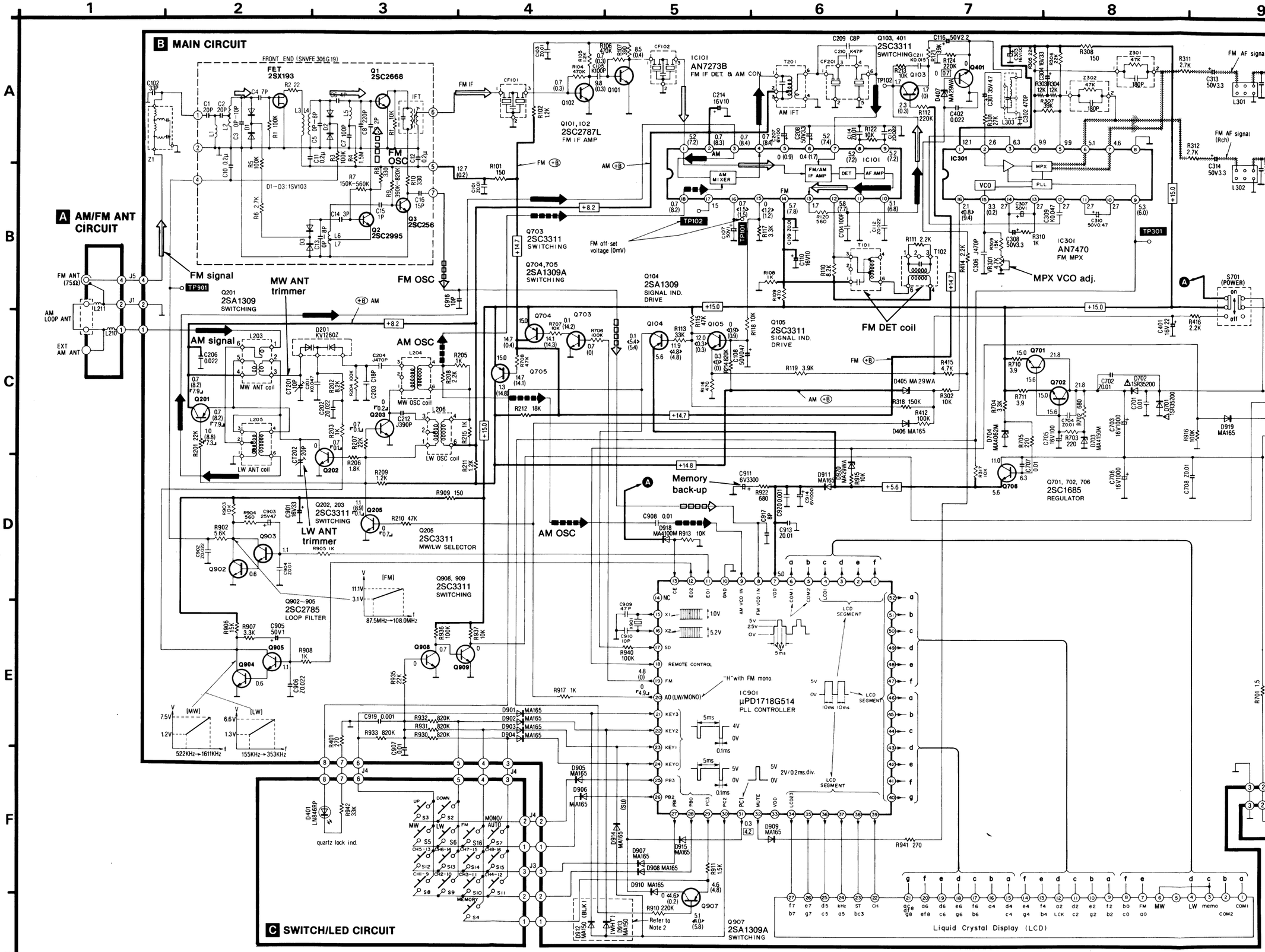
Ref. No.	Part No.	Value
C206	ECKD1H223ZF	0.022
C207	ECEA0JU101	100
C208	ECEA1HU3R3	3.3
C209	ECCD1H080CC	8P
C210	ECCD1H470K	47P
C211	ECFTD153KXL	0.015
C212	ECQP1391JZ	390P
C214	ECEA1CU100	10
C301	ECEA1VU4R7	4.7
C302	ECKD1H471KB	470P
C303	ECEA1CU101	100
C304	ECEA1CU330	0.01
C306	ECQP1471JZ	470P
C307	ECEA1HU010	1
C308	ECEA1HU3R3	3.3

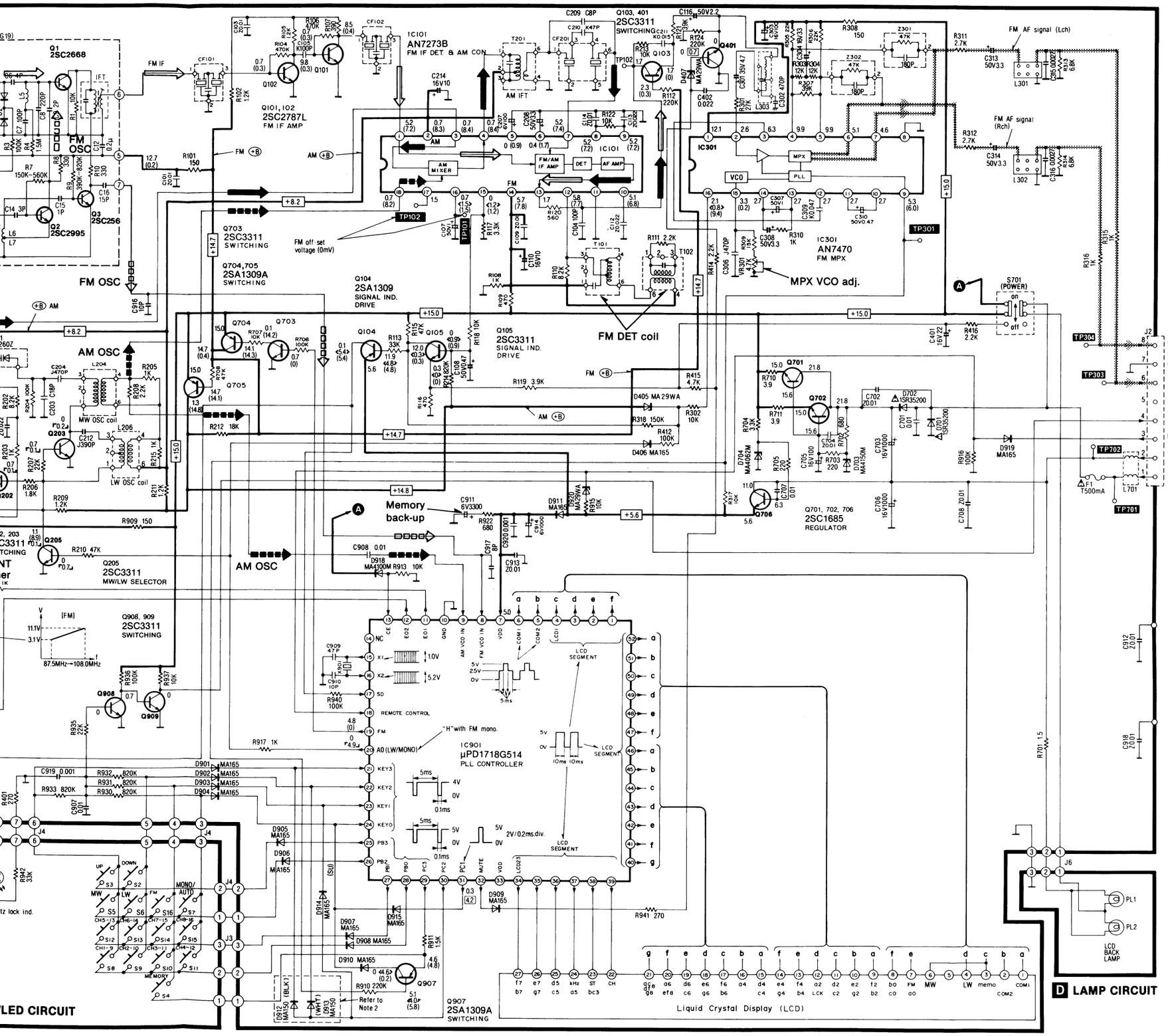
Ref. No.	Part No.	Value
C309	ECFTD473KXL	0.047
C310	ECEA1HUR47	0.47
C313, 314	ECEA1HU3R3	3.3
C315, 316	ECFTD272KXL	0.0027
C401	ECEA1CU220	22
C402	ECKD1H223ZF	0.022
C701, 702	ECKD1H103ZF	0.01
C703	ECEA1CU102	1000
C704	ECKD1H103ZF	0.01
C705	ECEA1CU101	100
C706	ECEA1CU102	1000
C707, 708	ECKD1H103ZF	0.01
C901	ECEA1CU330	33
C902	ECKD1H223ZF	0.022
C903	ECEA25M4R7R	4.7

Ref. No.	Part No.	Value
C904	ECKD1H103ZF	0.01
C905	ECEA1HU010	1
C906	ECKD1H223ZF	0.022
C907, 908	ECKD1H103ZF	0.01
C909	ECCD1H470K	47P
C910	ECCD1H100KC	10P
C911	ECEA0JU332	3300
C912, 913	ECKD1H103ZF	0.01
C914	ECEA0JU102	1000
C916	ECCD1H100KC	10P
C917	ECCD1H080CC	8P
C918	ECKD1H103ZF	0.01
C919, 920	ECKD1H102ZF	0.001

● RESISTORS

Ref. No.	Part No.	Value
R101	ERDS2TJ151	150
R102	ERDS2TJ122	1.2K
R104	ERDS2TJ474	470K
R105	ERDS2TJ122	1.2K
R106	ERDS2TJ474	470K
R107	ERDS2TJ391	390
R108	ERDS2TJ102	1K
R109	ERDS2TJ471	470
R110	ERDS2TJ822	8.2K
R111	ERDS2TJ222	2.2K
R112	ERDS2TJ224	220K
R113	ERDS2TJ333	33K
R115	ERDS2TJ473	47K
R116	ERDS2TJ471	470
R117	ERDS2TJ332	3.3K
R118	ERDS2TJ103	10K
R119	ERDS2TJ392	3.9K
R120	ERDS2TJ561	560
R121	ERDS2TJ392	3.9K
R122	ERDS2TJ103	10K
R124	ERDS2TJ224	220K
R201	ERDS2TJ223	22K
R202	ERDS2TJ822	8.2K
R203	ERDS2TJ102	1K
R204	ERDS2TJ104	100K
R205	ERDS2TJ102	1K
R206	ERDS2TJ182	1.8K
R207	ERDS2TJ223	22K
R208	ERDS2TJ222	2.2K
R209	ERDS2TJ122	1.2K
R210	ERDS2TJ473	47K
R211	ERDS2TJ122	1.2K
R212	ERDS2TJ183	18K
R213	ERDS2TJ103	10K
R214	ERDS2TJ824	820K
R215	ERDS2TJ102	1K
R301	ERDS2TJ273	27K
R302	ERDS2TJ103	10K
R303, 304	ERDS2TJ123	12K
R305, 306	ERDS2TJ223	22K
R307	ERDS2TJ393	39K
R308	ERDS2TJ151	150
R309	ERDS2TJ153	15K
R310	ERDS2TJ102	1K
R311, 312	ERDS2TJ272	2.7K
R313, 314	ERDS2TJ682	6.8K
R315, 316	ERDS2TJ102	1K
R317	ERDS2TJ103	10K
R318	ERDS2TJ154	150K
R401	ERDS2TJ271	270
R412	ERDS2TJ104	100K
R414	ERDS2TJ222	2.2K
R415	ERDS2TJ472	4.7K
R416	ERDS2TJ222	2.2K
R701	ERDS2TJ1R5	1.5
R702	ERDS2TJ681	680
R703	ERDS2TJ221	220
R704	ERDS2TJ332	3.3K
R705	ERDS2TJ221	220
R706	ERDS2TJ104	100K
R707	ERDS2TJ103	10K
R708	ERDS2TJ473	47K
R710, 711	ERDS2TJ3R9	3.9
R902	ERDS2TJ562	5.6K
R903	ERDS2TJ103	10K
R904	ERDS2TJ561	560
R905	ERDS2TJ102	1K
R906	ERDS2TJ153	15K
R907	ERDS2TJ332	3.3K
R908	ERDS2TJ102	1K
R909	ERDS2TJ151	150
R910	ERDS2TJ224	220K
R911	ERDS2TJ152	1.5K
R913	ERDS2TJ103	10K
R915	ERDS2TJ103	10K
R916	ERDS2TJ104	100K
R917	ERDS2TJ102	1K
R922	ERDS2TJ681	680
R930, 931	ERDS2TJ824	820K
R932, 933	ERDS2TJ824	820K
R935	ERDS2TJ223	22K
R936	ERDS2TJ104	100K
R937	ERDS2TJ103	10K
R940	ERDS2TJ104	100K
R941	ERDS2TJ271	270
R942	ERDS2TJ333	33K





— 4 —

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- **S2** : Tuning (down) switch.
  [down: tuning to lower frequency]
- **S3** : Tuning (up) switch.
  [up: tuning to higher frequency]
- **S4** : Memory set switch. (manual ↔ auto memory)
- **S5** : MW select switch.
- **S6** : LW select switch.
- **S7** : FM mode switch. (stereo ↔ mono)
- **S8~S15** : Preset tuning switch.
  * With it momentarily pushed (less than 0.4 sec.) and released, the 1~8 CH are received.
  * With it continuously pushed (0.4 sec. or more) and released, the 9~16 CH are received.
- **S16** : FM select switch.
- **S701** : Power switch in "on" position.
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  All voltage values shown in circuitry are DC voltage in FM signal (no signal) reception modes.
  * Figures in ≺ ≻ stand for DC voltage in FM stereo signal reception mode.
  * Figures in ( ) stand for DC voltage in AM signal reception mode.
  * Figures in ⌈ ⌋ stand for DC voltage in LW signal reception mode.
  * Figures in ▭ stand for muting mode.

  ——— Positive voltage lines
  ▫▫▫▫▷ FM OSC
  ▪▪▪▪▶ AM OSC
  ▒▒▒▒ AF signal lines
  ▭▭▭▭▷ FM signal
  ▬▬▬▬▶ AM signal
- Important safety notice.
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.

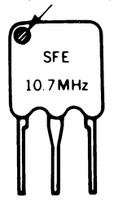
Part No.	Original Part No.	Supply Part No.
IC301	AN7470	SVIUPC1161C3
D912, 913	MA150	MA162A

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three versions. For this circuit, be sure to use the ceramics of the same version in a pair.
At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each version of the ceramic filters.

Color marking
(Red, Black or White)



VERSION (Color)	D912	D913	CENTER FREQUENCY
Black	○	×	10.65MHz
Red	×	×	10.70MHz
White	×	○	10.75MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

* Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

— 5 —

■ REPLACEMENT PARTS LIST

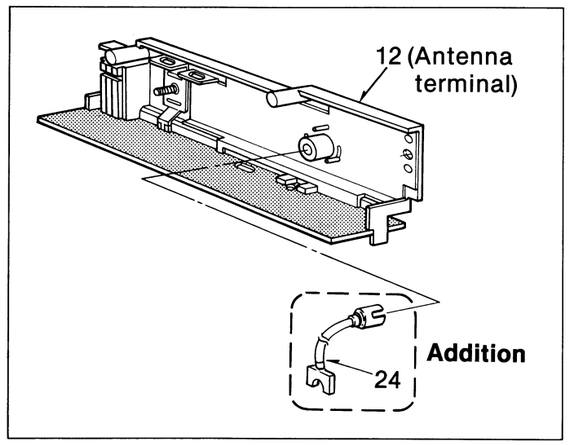
Notes: • Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
• The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7273A	IC
IC301	SVIUPC1161C3	IC
IC901	UPD1718G514	IC
TRANSISTORS		
Q101, 102	2SC2787L	Transistor
Q103, 105, 202, 203, 205, 401, 703, 908, 909	2SC3311−Q	Transistor
Q104, 201, 704, 705, 907	2SA1309Q	Transistor
Q701, 702, 706	2SC1685−QNC	Transistor
Q902~905	2SC2785F	Transistor
DIODES		
D201	KV1260Z	Diode
D401	LN846RP−C	L.E.D.
D406, 901~911, 914, 915, 919	MA165	Diode
D405, 407, 920	MA29WA	Diode
D701, 702 ⚠	1SR35200	Rectifier
D703	MA4150M	Diode
D704	MA4062−M	Diode
D912, 913	MA162A	Diode
D918	MA4100M	Diode
COILS		
L203	SLA2B3−P	AM Antenna
L204	SLO2B9R−P	AM OSC
L205	SLA1B7R−P	LW Antenna
L206	SLO1B5−P	LW OSC
L210, 211	ELEPK1R0MA	Cheke 1.0μH
L301, 302	SLM5B2−1P	L.P.F.
L303	SLM1B10−M	L.P.F.
L701	SLQB20G−1P	L.P.F.
TRANSFORMERS		
T101	SLI4B511−Z	FM IFT
T102	SLI4B513−Z	FM IFT
T201	SLI2B101−M	AM IFT
CERAMIC FILTERS		
CF101, 102	SVFE107MS2−A	FM, 10.7MHz (Red)
	SVFE107MS2−D	FM, 10.65MHz (Black)
	SVFE107MS2−E	FM, 10.75MHz (White)
CF201	SVFSFZ450F7L	AM, 450kHz

Ref. No.	Part No.	Description
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
VARIABLE RESISTOR		
VR301	QVNB3A00B472	MPX VCO 4.7kΩ
VARIABLE CAPACITORS		
CT201	ECRHA010A41	Trimmer
CT202	ECRHA020D41	Trimmer
LAMP		
PL1, 2	XAMS20Q10	
FUSES		
F1 ⚠	XBA2C05TR0	250V, T500mA
COMPONENT COMBINATIONS		
Z1	SLA4Z13−Z	B.P.F.
Z301, 302	EXRP102K473T	180pF, 47kΩ
SWITCHES		
S2~16	SSG13	Preset
S701 ⚠	SSH1217	Power Source
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9311	
FM FRONT END		
	SNVFE306G19	FM RF Pack

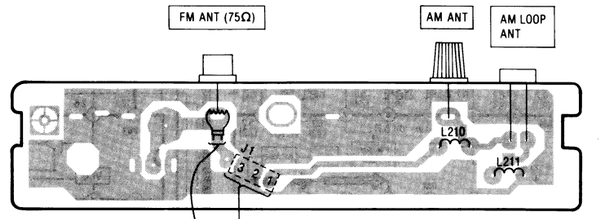
Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SGX7787−1A	Ornament	(1)
2	SGX7788−1	Ornament	(1)
3	SGYTX33−KG	Front Panel Ass'y	(1)
3-1	SGU490B	Transparent Plate	(1)
4	SBC761−1A	Button, Preset	(1)
5	SBC764−1	Button, Tuning	(1)
6	SBC807−5	Power Button	(1)
8	SBC762−2C	Button, Selector	(1)
9	SHR9787	LCD Spacer	(1)
10	SDU286B	Filter	(1)
11	SHR9786	Holder, LCD	(1)
12	SJF8304N	Terminal Board	(1)
14	SKC1700K994	Cabinet	(1)
15	SHR415	Nylon Pin	(2)
16	SMP401	Lamp Case	(1)
17	SGPTX33L−KE	Chassis Ass'y	(1)
17-1	SKL297−1	Foot	(4)
18	SUB260	Connection Rod	(1)
19	SJT347	Fuse Holder	(2)
20	SJT3311	Terminal (3P), (J6)	(1)
21	SJS5341	Socket (3P), (J6)	(1)
22	SJT30343−V	Socket (3P), (J3)	(1)
22	SJT30843−V	Socket (8P), (J4)	(1)
23	SWK1663	Cord	(1)
24	SJE115	Connection Cord	(1)
SCREWS			
N1	XTB3+8JFZ	Tapping, ⊕3×8	(2)
N2	XTB3+8G	Tapping, ⊕3×8	(6)
N3	XTBS3+8JFZ1	Tapping, ⊕3×8	(4)
N4	SNE2095−5	Cabinet	(4)
N5	XTW3+8T	Tapping, ⊕3×8	(1)
ACCESSORIES			
A1	SSA270	FM Antenna Cord	(1)
A2	SPB1139	Loop Antenna	(1)
A3	SGETX33L−KE1	Bracket, Left	(1)
A4	SGETX33L−KE2	Bracket, Right	(1)
A5	SQF12744	Instruction Book (Included SU-X33)	(1)
PACKING PARTS			
P1	SPG5695	Carton Box	(1)
P2	SPS4655−1	Pad, Left Side	(1)
P3	SPS4656−3	Pad, Right Side	(1)
P4	SPS4663	Pad, Up Side	(1)
P5	SPS3987	Pad, Down Side	(1)
P6	SPP741	Polyethylene Bag	(1)
P7	XZB16X25A02	Polyethylene Bag	(2)

■ EXPLODED VIEW (ADDITION)

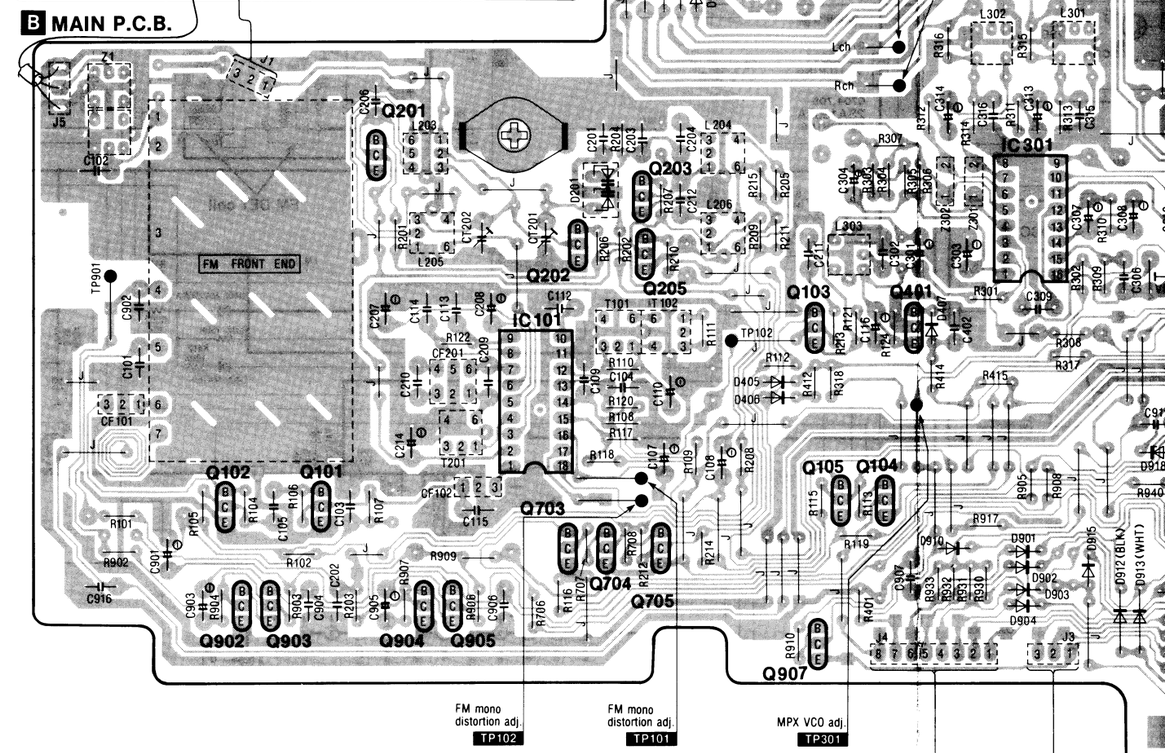


■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

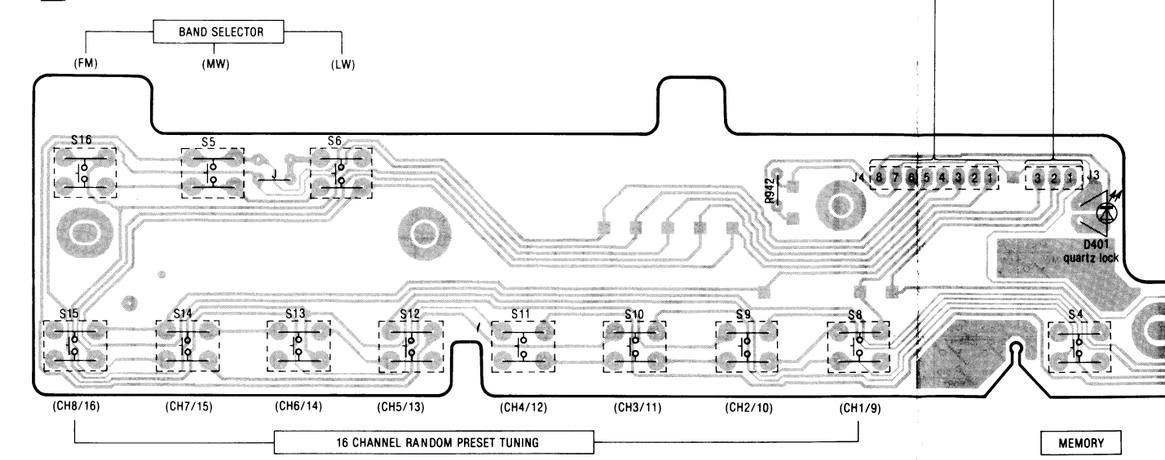
A AM/FM ANT P.C.B.



B MAIN P.C.B.



C SWITCH/LED P.C.B.



ion

Description	
ARTS	
Ornament	(1)
Ornament	(1)
Front Panel Ass'y	(1)
Transparent Plate	(1)
Button, Preset	(1)
Button, Tuning	(1)
Power Button	(1)
Button, Selector	(1)
LCD Spacer	(1)
Filter	(1)
Holder, LCD	(1)
Terminal Board	(1)
Cabinet	(1)
Nylon Pin	(2)
Lamp Case	(1)
Chassis Ass'y	(1)
Foot	(4)
Connection Rod	(1)
Fuse Holder	(2)
Terminal (3P), (J6)	(1)
Socket (3P), (J6)	(1)
Socket (3P), (J3)	(1)
Socket (8P), (J4)	(1)
Cord	(1)
Connection Cord	(1)
Tapping, ⊕3×8	(2)
Tapping, ⊕3×8	(6)
Tapping, ⊕3×8	(4)
Cabinet	(4)
Tapping, ⊕3×8	(1)
FM Antenna Cord	(1)
Loop Antenna	(1)
Bracket, Left	(1)
Bracket, Right	(1)
Instruction Book (Included SU-X33)	(1)
Carton Box	(1)
Pad, Left Side	(1)
Pad, Right Side	(1)
Pad, Up Side	(1)
Pad, Down Side	(1)
Polyethylene Bag	(1)
Polyethylene Bag	(2)

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

A AM/FM ANT P.C.B.

FM ANT (75Ω) · AM ANT · AM LOOP ANT · INPUT/OUTPUT CONNECTOR (To Amplifier)

B MAIN P.C.B.

Lch Output TP303 · Rch Output TP304 · AC 9.3V Supply TP702 · AC 9.3V Supply TP701 · F1 T500mA · FM FRONT END · IC101 · IC301 · IC901 · Q201 · Q202 · Q203 · Q205 · Q103 · Q401 · Q101 · Q102 · Q703 · Q704 · Q705 · Q907 · Q902 · Q903 · Q904 · Q905 · Q908 · Q909 · Q706 · Q702 · Q701 · FM mono distortion adj. TP102 · FM mono distortion adj. TP101 · MPX VCO adj. TP301 · LCD · (S701) · POWER

C SWITCH/LED P.C.B.

BAND SELECTOR (FM) (MW) (LW) · S16 S5 S6 S15 S14 S13 S12 S11 S10 S9 S8 S4 S3 S2 S7 · (CH8/16) (CH7/15) (CH6/14) (CH5/13) (CH4/12) (CH3/11) (CH2/10) (CH1/9) · 16 CHANNEL RANDOM PRESET TUNING · MEMORY

D LAMP P.C.B.

PL1 · PL2 · TUNING (up) (down) · FM MODE

D401 quartz lock

Printed in Japan
860601100 Ⓗ KS/TN

FRANÇAIS

■ MESURAGES ET REGLAGES

A.M./M.F. (ST-X33)
LW/MW/M.F. (ST-X33L)

Positionnements des commandes et équipement utilisé.
- Générateur de signaux M.F. et A.M. (AM et FM-SG).
- Modulateur stéréophonique
- Analyseur de distorsion
- Oscilloscope
- Voltmètre électronique à C.A. et C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100µH)
- Résistance (100kΩ)
- Condensateur céramique (200pF)

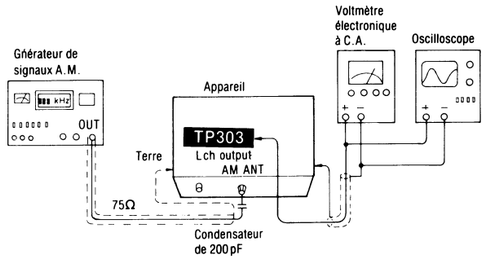
Nota: Pour **T201 (A.M.) F.I., L204 (bobine oscil. de AM (MW)** et **L205 (bobine ANT LW)**, des éléments réglés sont fournis. Aussi, ne pas tourner les noyaux de ces pièces.

REGLAGE DE O.M.-H.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "**AM (MW)**".
3. Régler le cadran radio et le générateur de signaux sur **612kHz**.
4. Régler **L205 (AM), L203 (MW)** pour une sortie maximale.
5. Régler le cadran radio et le générateur de signaux sur **1503kHz**.
6. Régler **CT202 (AM), CT201 (MW)** pour une sortie maximale.
7. Répéter les étapes 3.~6.

Nota:
Le niveau d'entrée d'antenne doit être aussi bas que possible étant libéré de la commande automatique de gain.

CONDITION DU GENERATEUR DE SIGNAUX A.M.
Modulation.....30%
Fréquence de modulation 400Hz

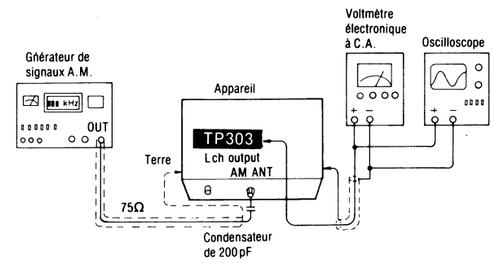


REGLAGE DE RE-LW (ST-X33L seulement)

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "**LW**".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **155kHz**.
4. Régler **L206** pour une sortie maximale.
5. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **353kHz**.
6. Régler **CT202** pour une sortie maximale.
7. Répéter les étapes 3.~6.

Nota:
Le niveau d'entrée d'antenne doit être aussi bas que possible étant libéré de la commande automatique de gain.

CONDITION DU GENERATEUR DE SIGNAUX A.M.
Modulation.....30%
Fréquence de modulation 400Hz

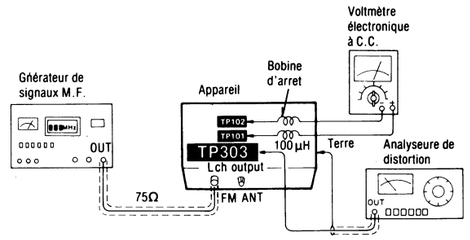


REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "**FM**" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100.10MHz**.
4. Régler le noyau de **T101** de telle sorte que la tension mesurée sur le mode de signaux soit de **0mV (0±50mV)** dans une plage de 1V.
5. Ajuster **T102** de telle que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.
7. Sássurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes l'un par rapport à l'autre.

Nota:
Le tournevis de réglage utilisé devra être fait en résines.

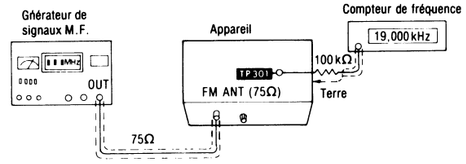
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation.....100%
Fréquence de modulation 400Hz
Niveau de sortie.....66dB



REGLAGE MULTIPLEX DE L'OSCILLATEUR COMMANDÉ PAR VARIATION DE TENSION

1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "**FM auto**".
3. Régler le cadran radio et le générateur de signaux sur **100.1MHz**.
4. Ajuster **VR301** pour **19kHz±50Hz** sur le compteur de lecture de fréquences.

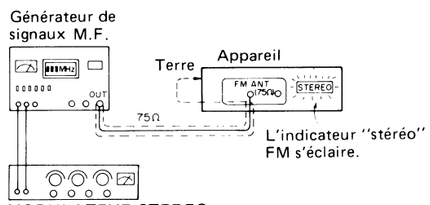
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation.....0
Fréquence de modulation 0
Niveau de sortie.....66dB



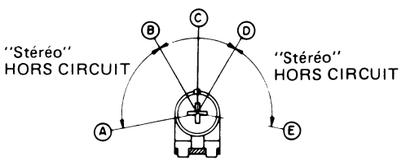
★ EN UTILISANT UN SYSTEME ALTERNATIF

1. Applique un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2. Ajuster **VR301** jusqu'à ce que l'indicateur stéréo s'éciaire. Coller le bras de **VR301** comme il montré sur la figure.

CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation 10%
Fréquence de modulation. . . Pilote (19 kHz)
Niveau de sortie. . . . . 66 dB



MODULATEUR STEREO
Signal pilote sun "ON" (mise en circuit) . . . 19 kHz
Mode de sortie. . . . . Gauche + Droite



VR301

Ⓐ—Ⓑ,
Ⓓ—Ⓔ..... Position de HORS CIRCUIT "Stereo".
Ⓑ—Ⓓ..... Position de MISE EN CIRCUIT "Stereo". (Eciairage de l'indicateur)
Ⓒ..... Point de réglage du circuit pilote.

ESPAÑOL

ESPAÑOL

■ MEDICIONES Y AJUSTES

AM/FM (ST-X33)
LW/MW/FM (ST-X33L)

Posiciones de control y equipo usado.
- Generador de señales de AM y FM (AM & FM-SG).
- Modulador estéreo
- Analizador de distorsiones
- Osciloscopio
- Voltímetro electrónico de CA y CC (EVM)
- Frecuencimetro
- Bobina de choque (100µH)
- Resistor (100kΩ)
- Capacitor cerámico (200pF)

Nota: Para **T201 (AM-IFT)**, **L204 (bobina de OSC. AM (MW))** y **L205 (bobina antena LO)**, son suministradas piezas ajustadas.
Por lo tanto, no gire los núcleos de estas piezas.

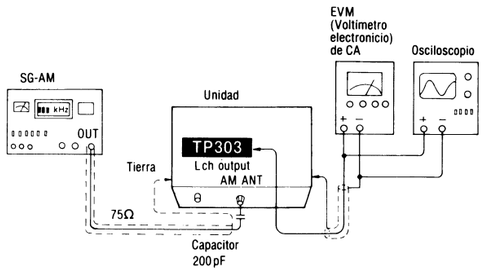
AJUSTE DE OM (MW)-RF

1. La conexión del equipo de pruebas se muestra en la figura.
2. Ajustar la unidad a la posición "**AM (MW)**".
3. Poner el indicador de la radio y el generador de señales en **612kHz**.
4. Ajuste **L205 (AM)**, **L203 (MW)** para salida máxima.
5. Poner el indicador de la radio y el generador de señales en **1503kHz**.
6. Ajuste **CT202 (AM)**, **CT201 (MW)** para salida máxima.
7. Repita los pasos 3.~6.

Nota:

El nivel de entrada de antena ha de ser lo más bajo posible estando libre de AGC (control automático de ganancia).

CONDICION DE GENERADOR DE SEÑALES DE AM
Modulación 30%
Frecuencia de modulación 400Hz



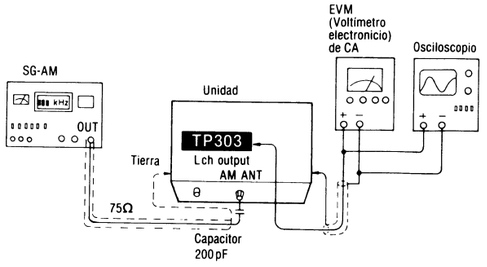
AJUSTE DE LO-RF (Sólo ST-X33L)

1. La conexión del equipo de pruebas se muestra en la figura.
2. Ajustar la unidad a la posición "**LW**".
3. Poner el indicador de la radio y el generador de señales en **155kHz**.
4. Ajuste **L206** para salida máxima.
5. Poner el indicador de la radio y el generador de señales en **353kHz**.
6. Ajuste **CT202** para salida máxima.
7. Repita los pasos 3.~6.

Nota:

El nivel de entrada de antena ha de ser lo más bajo posible estando libre de AGC (control automático de ganancia).

CONDICION DE GENERADOR DE SEÑALES DE AM
Modulación 30%
Frecuencia de modulación 400Hz



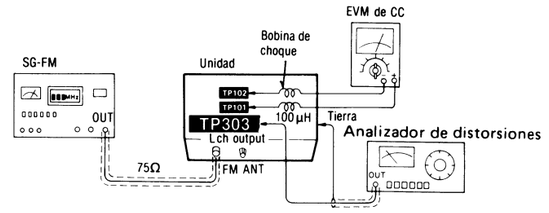
AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de pruebas se muestra en la figura.
2. Ajustar la unidad a la posición "**FM**".
3. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **100,10MHz**.
4. Ajustar el nućleo de **T101** de manera que el voltaje medido en modalidad de señal sea **0mV (0±50mV)**.
5. Ajustar **T102** de manera que el factor de distorsión de CH I se minimice.
6. Repetir los pasos 4 y 5 algunas veces.
7. Asegurarse de que los factores de distorsión de CH I y CH D sean casi los mismos uno con el otro.

Nota:

El destornillador de ajuste usado debe estar hecho de resina.

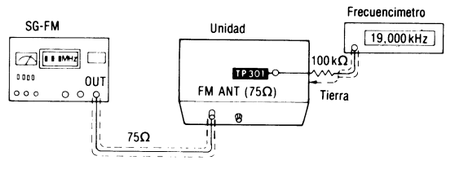
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 100%
Frecuencia de modulación 400Hz
Niveau de salida 66dB



AJUSTE DE MPX VCO (OSCILADOR CONTROLADO POR VOLTAJE MPX)

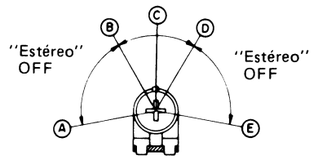
1. La conexión del equipo de prueba se muestra en la figura.
2. Poner la unidad en la posición de "**on/auto**".
3. Coloque el indicador de la radio y la puesta del generador de señales en **100.1MHz**.
4. Ajuste **VR301** para **19kHz±50Hz** en lectura de frecuencímetro.

CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 0
Frecuencia de modulación 0
Niveau de salida 66dB



★ USANDO SISTEMA ALTERNATIVO

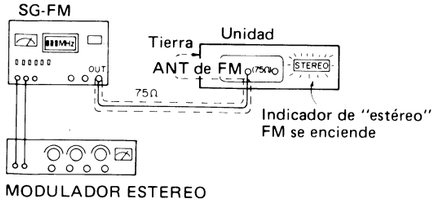
1. Aplique señal estereofónica del generador o reciba la emisión estereofónica.
2. Ajuste **VR301** hasta que el indicador de estéro se encienda. Cemente brazo de **VR301** como se muestra en la figura.



VR301

Ⓐ—Ⓑ,
Ⓓ—Ⓔ ..... Pósición de "estéreo" OFF.
Ⓑ—Ⓓ ..... Pósición de "estéreo" ON. (indicador encendido)
Ⓒ ..... Punto de ajuste de circuito piloto.

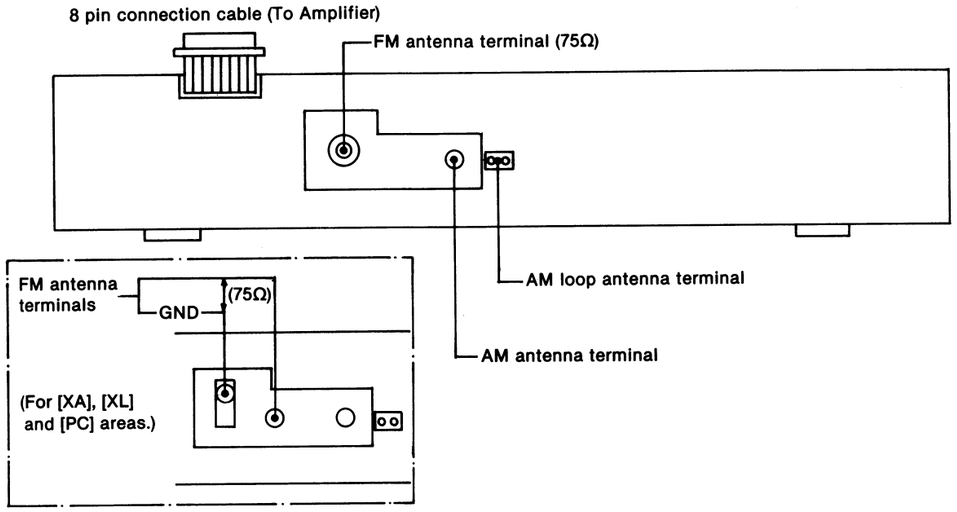
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación. 10%
Frecuencia de modulación. . . Pilot (19 kHz) 66 dB



MODULADOR ESTEREO
Señal piloto a ON. . . . . 19 kHz
Modalidad de salida. . . . . Izquierdo + Derecho

Printed in Japan
860505600 Ⓗ NH. MS.

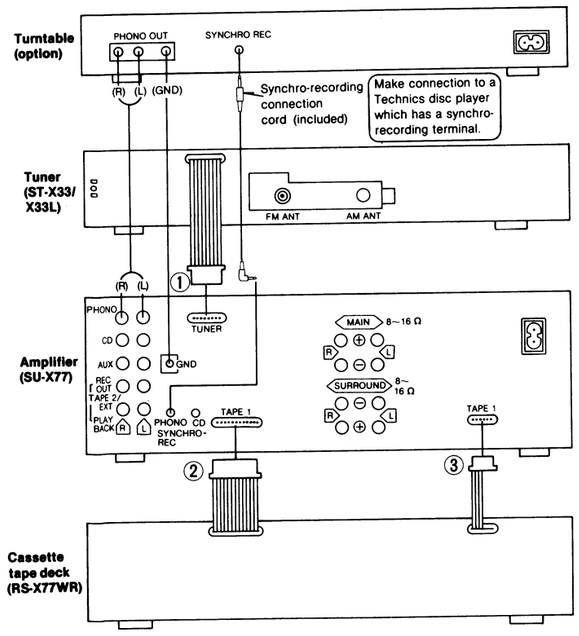
• **Rear panel**

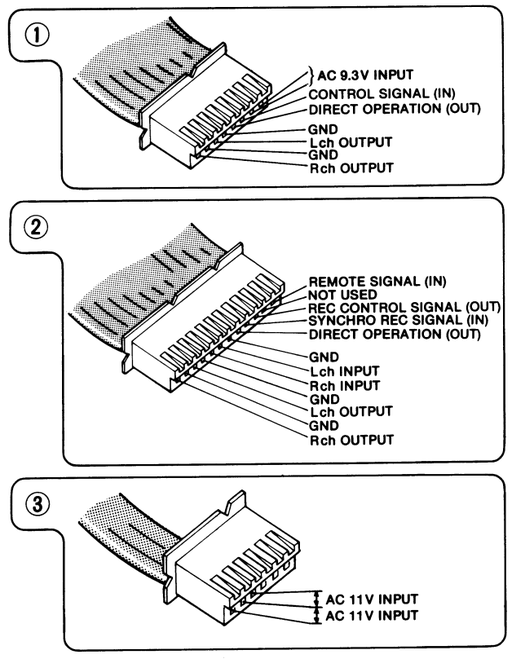


■ HOW TO CONNECT (1)

Connect the turntable, tuner, amplifier, and cassette deck as shown.
If the connection is wrong, normal operation will not be attained.

* Tuner (ST-X33/X33L) and Cassette deck (RS-X77WR) is not equipped with power supply. So the amplifier shown or power supply fixture is necessary for the repair and check to Tuner, and Cassette deck

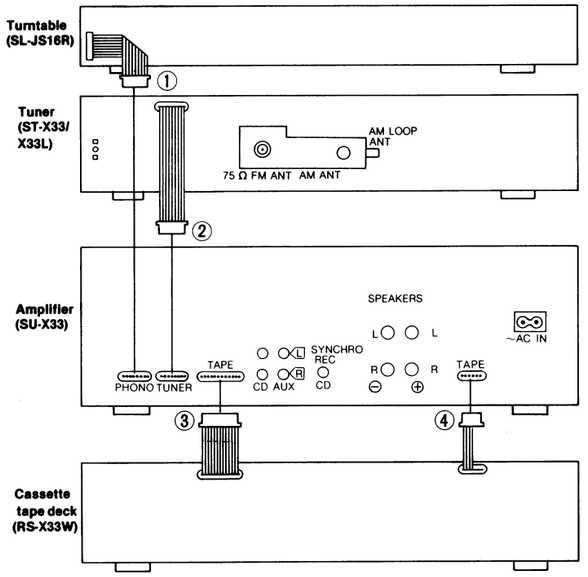


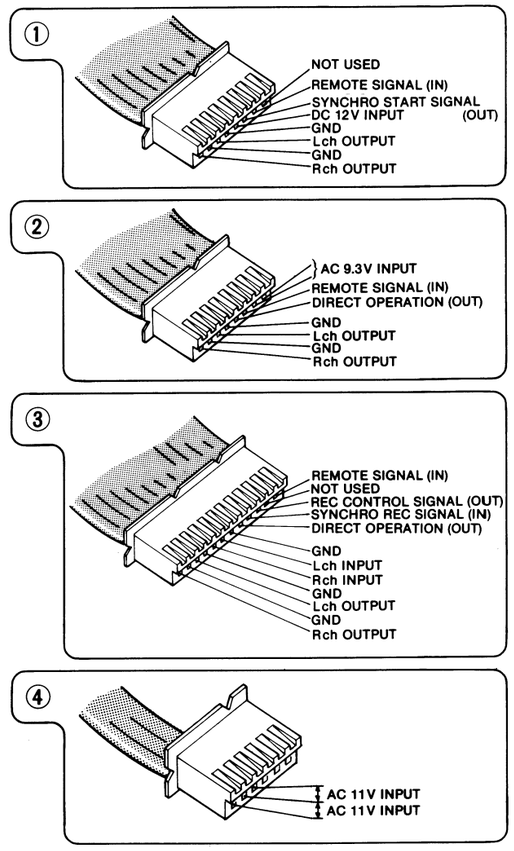


■ HOW TO CONNECT (2)

Connect the turntable, tuner, amplifier, and cassette deck as shown.
If the connection is wrong, normal operation will not be attained.

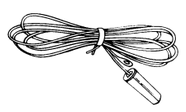
* Tuner (ST-X33/X33L) and Cassette deck (RS-X33W) is not equipped with power supply. So the amplifier shown or power supply fixture is necessary for the repair and check to Tuner, and Cassette deck



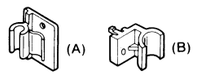


■ ACCESSORIES

- FM indoor antenna 1

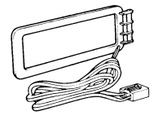


- AM antenna holders 2



- Attachment plug 1
  (For United Kingdom only)

- AM loop antenna 1

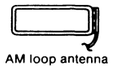


- Screws 2

■ MEMORY PRESETTINGS

The indication AM used here includes both MW and LW for Model ST-X33L.

Important!



If this antenna is not installed, AM broadcasts will not be received.

With this tuner you may preset as many as 16 radio broadcast stations: FM/AM random presetting. After broadcast stations have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

Notes:
1. For automatic presetting in areas where there are less than 16 FM stations, the remaining channels (through channel 16) will be left empty. The empty channels can be filled by using manual memory presetting.
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.
3. For AM broadcasts with extremely strong signal transmissions, the frequency memorized may be slightly different from the correct frequency. If this occurs, use the manual control to memorize.

Automatic memory presetting

ST-X33L The FM broadcasting stations, MW broadcasting stations, and LW broadcasting stations will be automatically preset in channels 1 through 16 for FM, 9 through 16 for MW, and 13 through 16 for LW, respectively.

Note: When MW is automatically preset, the FM stations on channels 9 through 16 will be replaced by the new MW stations.
When LW is automatically preset, the MW stations on channels 13 through 16 will be replaced by the new LW stations.

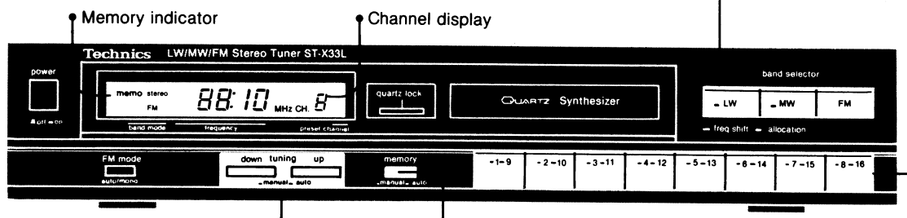
ST-X33 The FM broadcasting stations and AM broadcasting stations will be automatically preset to channels 1 through 16 for FM and 9 through 16 for AM, respectively.

Note: When AM is automatically preset, the FM stations on channels 9 through 16 will be replaced by the new AM stations.

1

ST-X33L	ST-X33
"LW": for LW broadcasts	**"AM":** for AM broadcasts
"MW": for MW broadcasts	**"FM":** for FM broadcasts
"FM": for FM broadcasts	

Note:
Before presetting the broadcasting stations, press to select the appropriate frequency step for your locality.



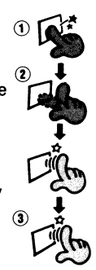
2 Set to the lowest frequency.

Tuning
Press the left button to change the frequency downward, and press the right button to change the frequency upward.

ST-X33L
- **LW: 153 kHz** (–2kHz shift) **or 155 kHz**
- **MW: 522 kHz** (9 kHz step) **or 530 kHz** (10 kHz step)
- **FM: 87.50 MHz**

ST-X33
- **AM:** (For Europe, South Africa and Australia) **522 kHz** (9 kHz step) **or 530 kHz** (10 kHz step) (For Saudi Arabia and others) **531 kHz** (9 kHz step) **or 530 kHz** (10 kHz step)
- **FM: 87.50 MHz**

① Press the button and hold slightly (frequency will change continuously).
② Release it when approaching the above exact frequency, and then press the button again momentarily (frequency change will stop).
③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.



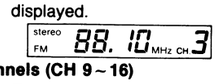
3 Press. When the frequency indication begins to change, release.

The frequency will change upward, and the automatic presetting will begin with the next broadcasting station.
It will continue to preset consecutive broadcast stations.

4 Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

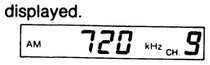
- **To check the front channels (CH 1 ~ 8)**
  Press momentarily.

→ Frequency stored in the memory and channel number are displayed.



- **To check the back channels (CH 9 ~ 16)**
  Press slightly longer.

→ Frequency stored in the memory and channel number are displayed.



■ "Most-recent" memory

The most-recent memory is a system by which the unit "remembers" the FM or AM broadcast station last heard when this unit is turned off, and automatically tunes to that station the next time the power is turned on.

■ "Back-up" memory

This is the function which preserves the preset memory and most-recent memory functions. In the event of a power failure, or if the power cord of the amplifier is disconnected from the electric outlet, the back-up memory will preserve the preset memory and most-recent memory functions for as long as approximately one week.

■ To prevent erasing the memory

If the power supply is interrupted for one week or longer, the memory settings will be erased.
For example:
1) If the power cord of the amplifier is disconnected from the electric outlet,
2) If an audio timer is used and the timer does not operate the tuner for a week or longer,
3) If a power failure occurs, etc.

If any of the above occurs, the memory will have to be reset.
The memory in the tuner is maintained by capacitor. If the power supply is interrupted for a week or longer, set the power switch of the amplifier and tuner to the "on" position for sixty minutes or more in order to recharge the capacitor. Then reprogram the memory.

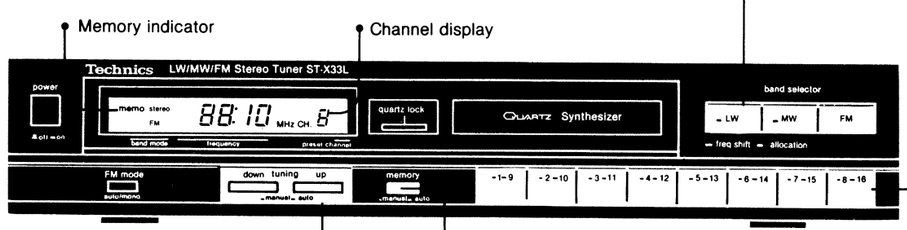
Manual memory presetting

Stations can be freely preset to any desired channel.

1

ST-X33L	ST-X33
"LW": for LW broadcasts	**"AM":** for AM broadcasts
"MW": for MW broadcasts	**"FM":** for FM broadcasts
"FM": for FM broadcasts	

Note:
Before presetting the broadcasting stations, press to select the appropriate frequency step for your locality.



2 Press the appropriate tuning button to tune to the desired broadcast.

Tuning
Press the left button to change the frequency downward, and press the right button to change the frequency upward.

- **Automatic tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

- **Manual tuning**
  Press the button momentarily and tune to the desired station. The frequency will change each time the button is pressed.

3 Press momentarily, and then release.

(The memory indicator will illuminate for approximately 4 seconds.)

Note:
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically. To stop the automatic memory presetting, once again press either the "up" button or the "down" button.

4 While the memory indicator is illuminated, press the button of the desired channel.

When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.

- **To preset channels 1 through 8**
  Press the appropriate button momentarily, and then release. (Preset channel number is displayed on the channel display.)

- **To preset channels 9 through 16**
  Press the appropriate button slightly longer, and then release. (Preset channel number is displayed on the channel display.)

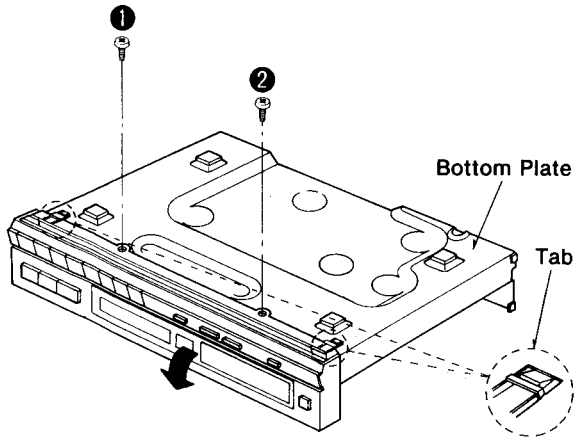
Note:
If the memory indication illumination stops before you press the button, once again repeat step 3 and then step 4.

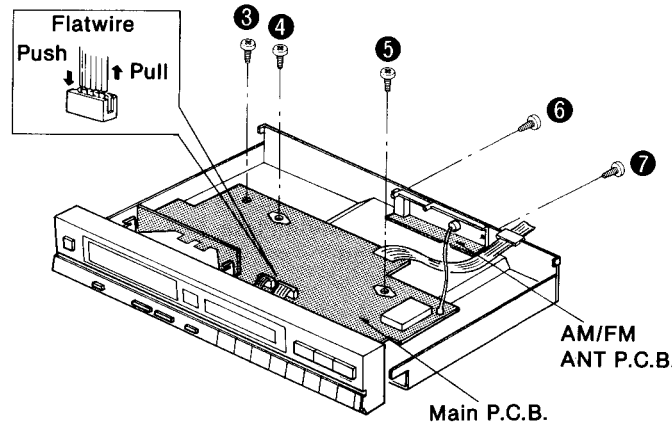
5 Enter the name (call sign, etc.) of the preset broadcasting station on the station memory file sheet.

This completes the procedures for presetting radio broadcast frequencies. The other preset-tuning buttons can be preset in the same way by following steps 1 through 5.

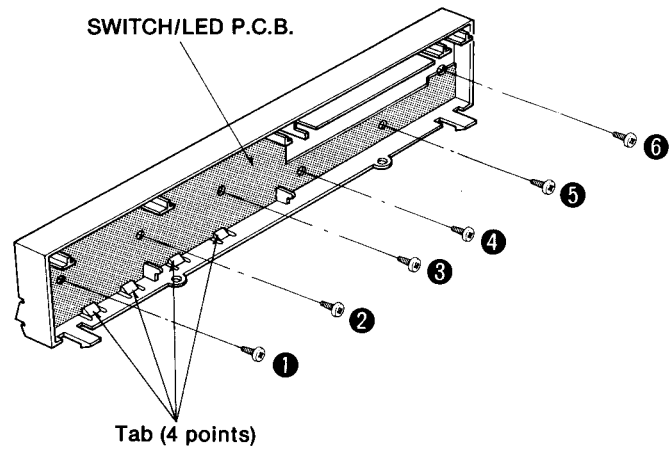
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet	Ref. No. 2	How to remove the main P.C.B.
Procedure 1	• Remove the 4 screws.	Procedure 1 → 2	• Remove the 2 screws (❶, ❷). • Remove the 2 tabs. • Remove the front panel. • Remove the 5 screws (❸~❼).

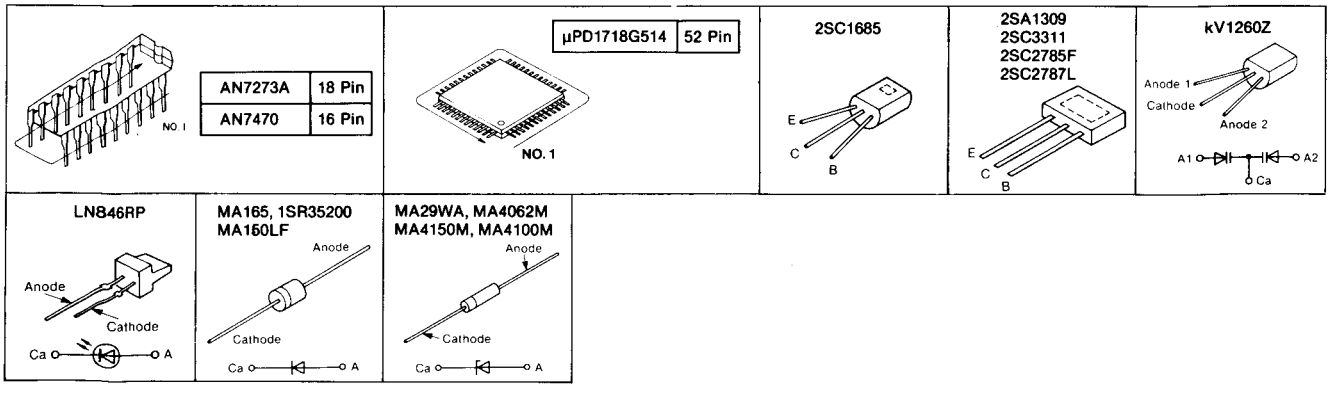




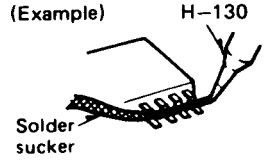
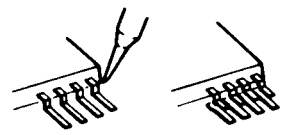
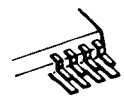
Ref. No. 3	How to remove SWITCH/LED P.C.B.
Procedure 1 → 2 → 3	• Remove the 6 screws (❶~❻). • Remove the 4 tabs.



■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



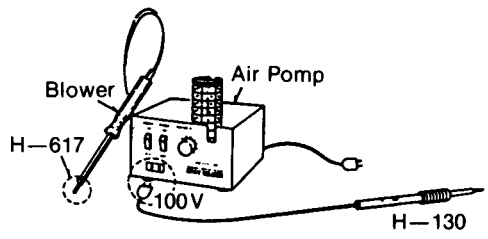
■ HOW TO REPLACE IC'S (Small outline type)

Replacing procedure			Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H–130 	• Recommended tool .....Special soldering iron * H605M and H-130. * H605E and H-130. • Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. • When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. • When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

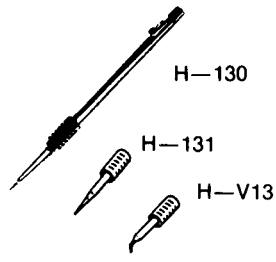
*** Special soldering iron**
(Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada
(Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

•H–605 Spot Heater (hot-air solder iron)
This device that uses hot air to melt solder was developed to remove Flat-Pakage ICs, RHCs and chip parts.

- H–605M (For 120V power source)
- H–605E (For 200V/220V/240V power source)



H–617



•H–617 Twin Nozzle (for spot heater)
Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm×2)

•H–130 Slim Pencil Solder Iron
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc., to high-density circuit boards.
Features:

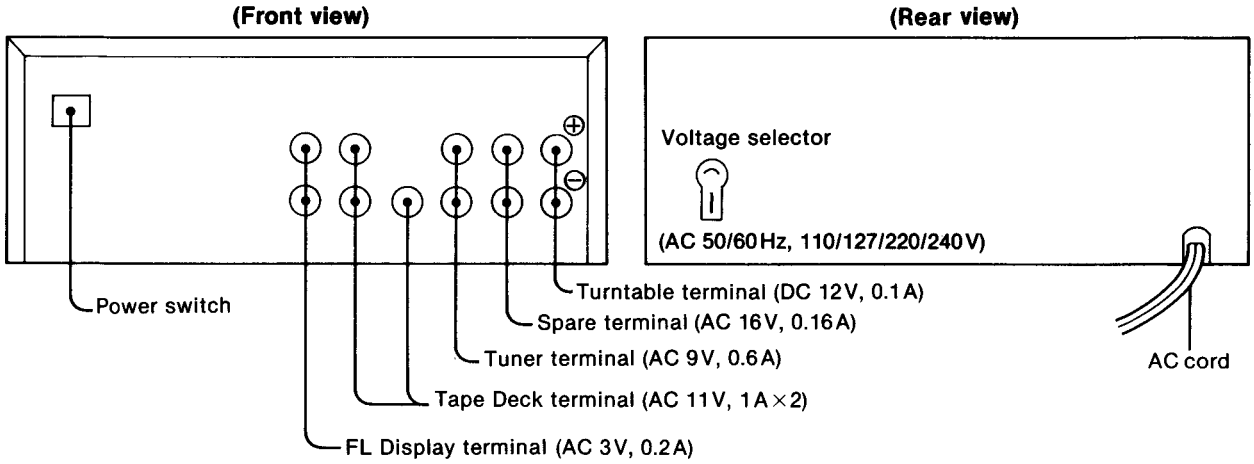
• Rated power:	100V, 15W
• Max. temp.:	400°C
• Heater:	ceramic (long life)
• Insulation resistance:	100MΩ
• Length:	178mm
• Weight:	16g (not including cord)

•H–131, H–V13 Cap Bits
Solder tip for the slim pencil Solder Iron and is composed of a bit holder and a corrosion resistance solder tip.
Permits changing of solder tips even while still hot.

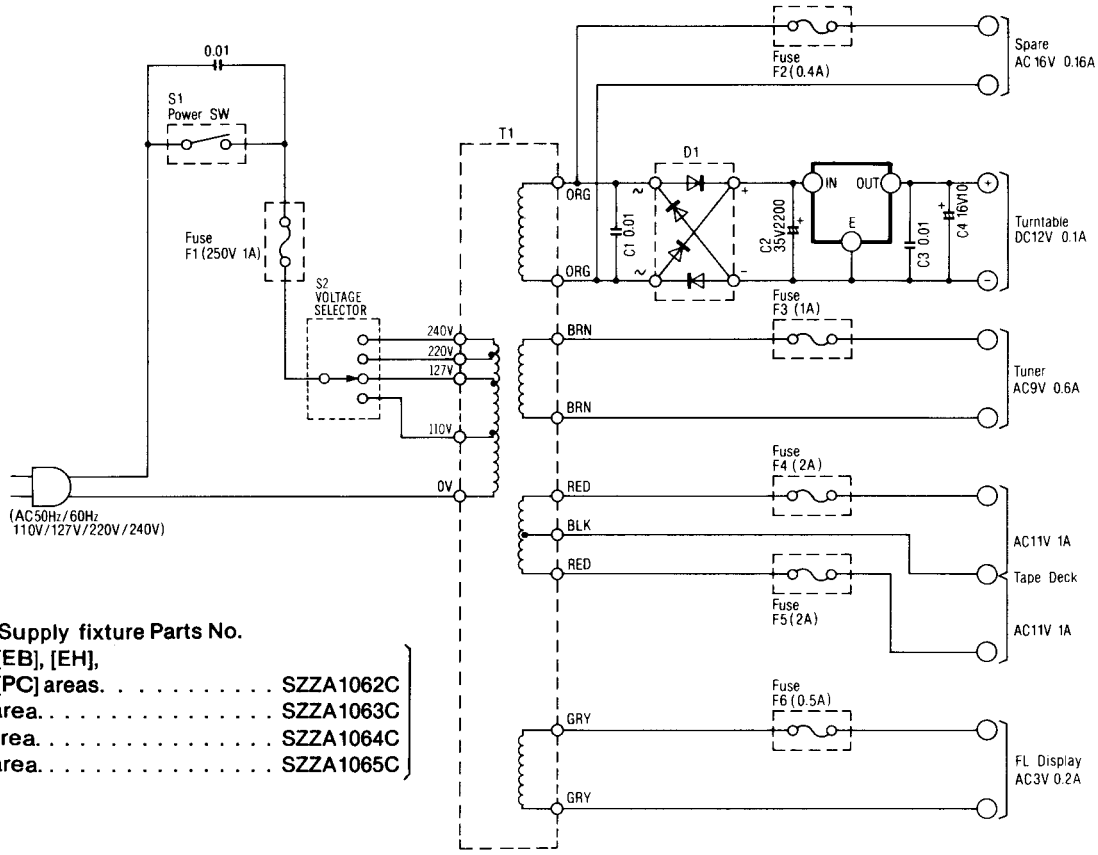
• Solder tip:	0.3mm

■ INFORMATION ON POWER SUPPLY FIXTURE

• LOCATION



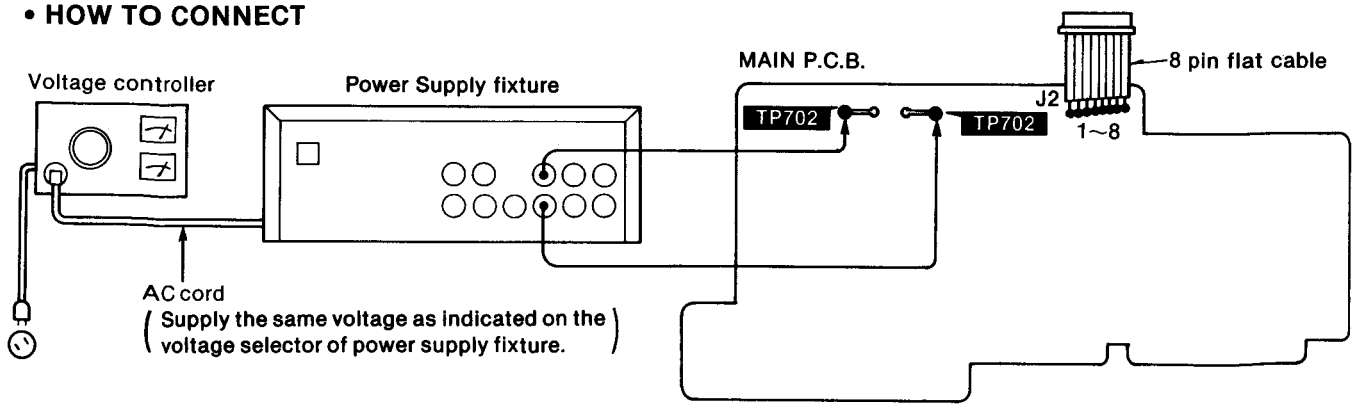
• SCHEMATIC DIAGRAM (Reference)



※ Power Supply fixture Parts No.

- [EX], [EB], [EH], [EF], [PC] areas. SZZA1062C
- [EK] area. SZZA1063C
- [XL] area. SZZA1064C
- [XA] area. SZZA1065C

• HOW TO CONNECT



■ FUNCTION OF TERMINAL (PLL controller IC901: μPD1718G514)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1 ~ 4, 34 ~ 52	OUTPUT	LCD4 ~ LCD1, LCD23 ~ LCD5	Segment signal output terminal for display.
5	OUTPUT	COM2	Common signal output terminal connected to LCD. Output is delivered in 3 values of ground, 1/2V_{DD} and V_{DD} (at 5ms intervals) in a period of 50Hz. The segment turns ON when the difference in voltage is $\pm V_{DD}$ between these terminals and LCD1~LCD23.
6		COM1	
7	INPUT	V_{DD}	Power supply terminal of device. Voltage of 5V±10% is supplied during operation of device. To hold the internal date memory (RAM), the voltage can be decreased to 2.5V. **Note:** Pins 7 and 33 are connected inside the chip. It is unnecessary to supply voltage to the pins.
33		V_{DD}	
8	INPUT	FM	Input is local oscillator output (VCO) in a range of 10~130MHz (0.3Vp-p, min.). There are 1/2 fixed frequency division prescaler and 2-step (1/32, 1/33) prescaler internally. Therefore, when deciding the frequency dividing value of programmable divider, it must be decided from the frequency obtained by halving the local oscillator output (VCO).
9	INPUT	AM	Input is local oscillator output (VCO) in a range of 0.5~20MHz (0.1Vp-p, min.). When the mode is shifted to FM, the AM terminal voltage automatically becomes the supply voltage of device.
10	———	GND	Ground terminal.
11	OUTPUT (ST-X33L only)	E01	When the divided oscillator frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
12	OUTPUT	E02	
13	INPUT	CE	Device selection signal input terminal. The signal level should be high when the device is operated, and low when not operated. With this terminal shifted to low level, LCD (liquid crystal display) turns off and the memory is held.
14	———	NC	Not used in this unit.
15	OUTPUT	X1	Connecting terminal for crystal oscillator. The crystal connected is 4.5MHz.
16	INPUT	X2	
17	INPUT	SD	Terminal to put in stop signal during auto tuning. The voltage is 5V with broadcast received, and 0V without broadcast received.
18	INPUT	REMOTE CONTROL	This is the interrupt demand signal input terminal. The signal from the control input terminal is put into this terminal, demanding for interruption, then the flow of program will be unconditionally shifted to the address No. 1.
19	OUTPUT	FM	FM/AM output terminal. (FM → 5V, AM → 0V)
20	OUTPUT	LW/FM MONO	Auto/mono changeover output terminal. (auto → 0V, mono → 5V)
21 ~ 24	INPUT	KEY3 ~ KEY0	Input terminal for key return signal from external key matrix.
25 ~ 28	OUTPUT	PB3 ~ PB0	Output terminal for key return signal to external key matrix.
29	OUTPUT	PC3	Terminal for FM IF ceramic filter frequency compensation. A pulse is generated when the voltage of terminal 13 rises.
30	OUTPUT	PC2	Output terminal for key return signal to let the stereo indicator light up.
31	OUTPUT	PC1	Not used in this unit.
32	OUTPUT	MUTE	Muting signal output terminal. Muting signal is delivered during operation of FM/AM selector switch and tuning switch. (4V during muting)

[KEY MATRIX]

Pin No.	25	26	27	28	29
21	UP	AM (MW)	CH5/ 13	CH1/ 9	—
22	DOWN	LW	CH6/ 14	CH2/ 10	—
23	—	FM	CH7/ 15	CH3/ 11	MEMORY
24	—	FM MODE	CH8/ 16	CH4/ 12	—

LW: ST-X33L only

■ MEASUREMENTS AND ADJUSTMENTS

■ AM/FM (ST-X33)
LW/MW/FM (ST-X33L)

Control positions and equipment used

- AM and FM signal generator (AM and FM-SG)
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter (EVM)
- Frequency counter
- Choke coil (100 μH)
- Resistor (100 kΩ)
- Ceramic capacitor (200 pF)

Note: For **T201 (AM-IFT)**, **L204 (AM (MW) OSC coil)** and **L205 (LW ANT coil)**, adjusted parts are supplied. So, do not turn the cores of this parts.

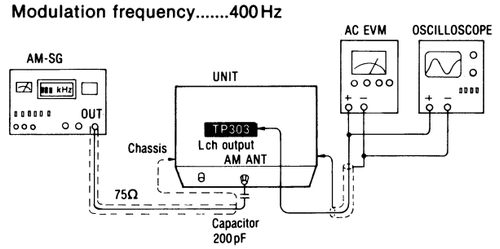
AM (MW)-RF ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**AM (MW)**" position.
3. Place the radio dial and signal generator setting to **612 kHz**.
4. Adjust **L205 (AM)**, **L203 (MW)** for maximum output.
5. Place the radio dial and signal generator setting to **1503 kHz**.
6. Adjust **CT202 (AM)**, **CT201 (MW)** for maximum output.
7. Repeat steps 3.~6.

Note:

Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency.....400 Hz



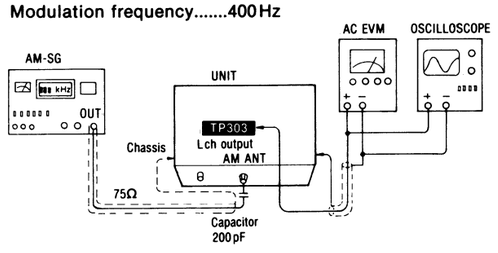
LW-RF ADJUSTMENT (ST-X33L only)

1. Test equipment connection is shown in figure.
2. Set the unit to "**LW**" position.
3. Place the radio frequency display and signal generator setting to **155 kHz**.
4. Adjust **L206** for maximum output.
5. Place the radio frequency display and signal generator setting to **353 kHz**.
6. Adjust **CT202** for maximum output.
7. Repeat steps 3.~6.

Note:

Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency.....400 Hz



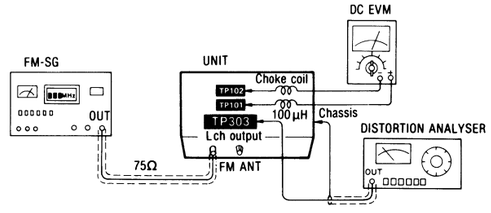
FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0 mV (0±50 mV)** in 1 V range.
5. Adjust **T102** so that the distortion factor of Lch is minimized.
6. Repeat steps 4 and 5 a few times.
7. Make sure that the distortion factors of Lch and Rch are at minimum and nearly equal.

Note:

The adjusting screwdriver used should be made of resin.

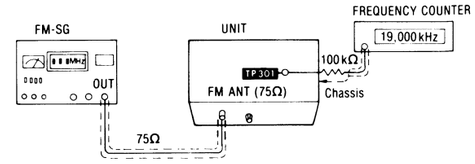
FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency.....400 Hz
Output level.....66 dB



MPX VCO ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM auto**" position.
3. Place the radio dial and signal genarator setting to **100.1 MHz**.
4. Adjust **VR301** for **19 kHz±50 Hz** on frequency counter reading.

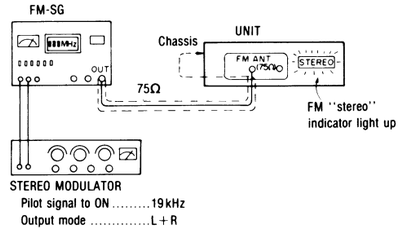
FM SIGNAL GENERATOR CONDITION
Modulation 0
Modulation frequency.....0
Output level.....66 dB

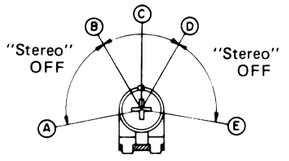


★ USING ALTERNATE SYSTEM

1. Apply stereo signal from generator or receive the stereo boardcast.
2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 10%
Modulation frequency.....Pilot (19 kHz)
Output level.....66 dB

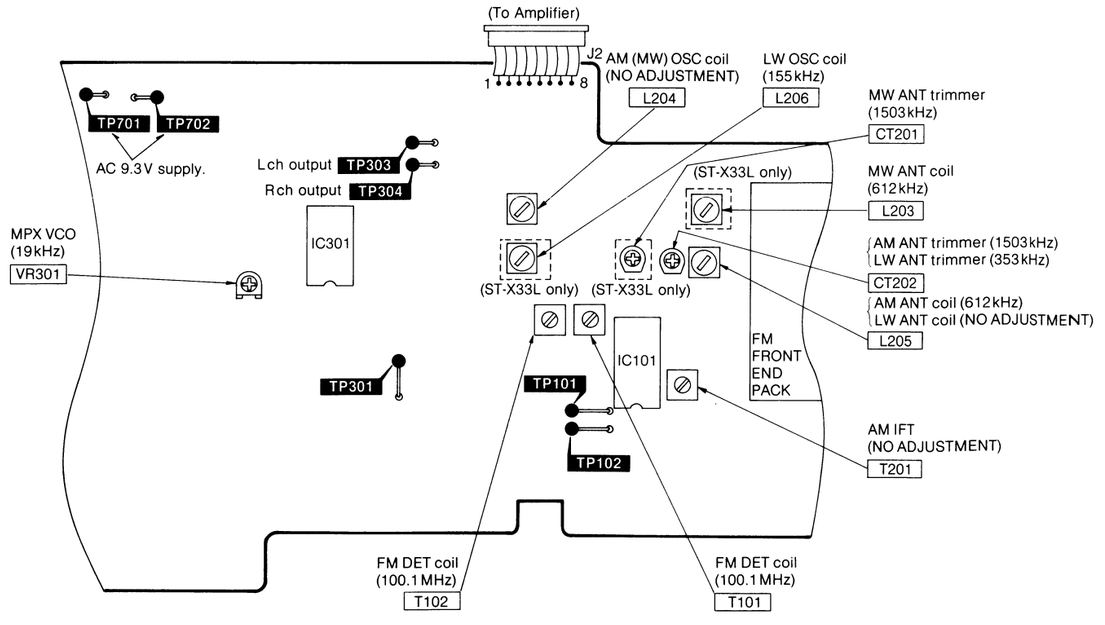




VR301

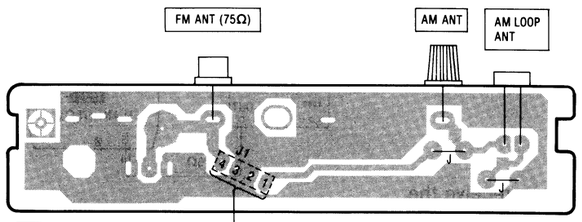
Ⓐ−Ⓑ,
Ⓓ−Ⓔ.....“Stereo” OFF position
Ⓑ−Ⓓ.....“Stereo” ON position (Indicator lighting)
Ⓒ.....Adjust point of pilot circuit

• Adjustment points



■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (ST-X33)

A AM/FM ANT P.C.B.



INPUT/OUTPUT CONNECTOR (To Amplifier)

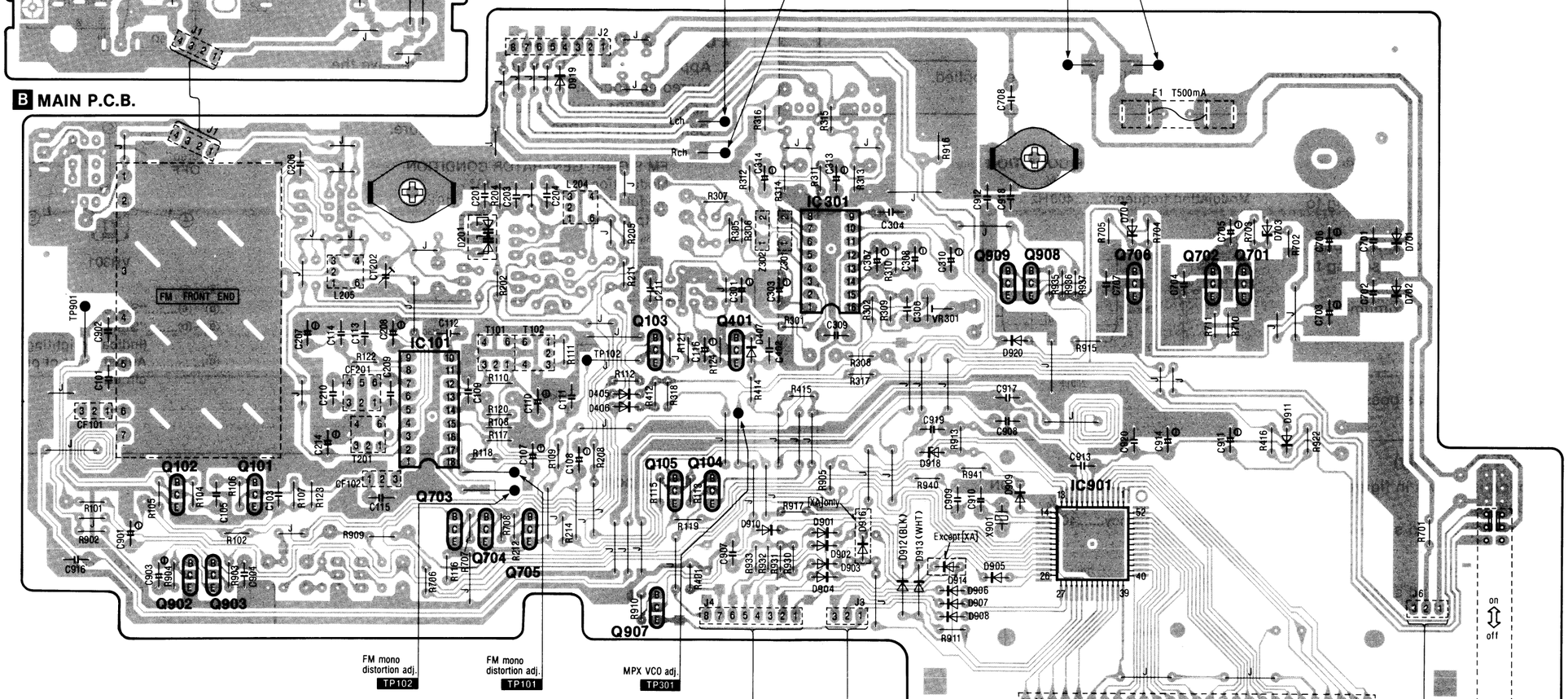
Lch Output TP303

Rch Output TP304

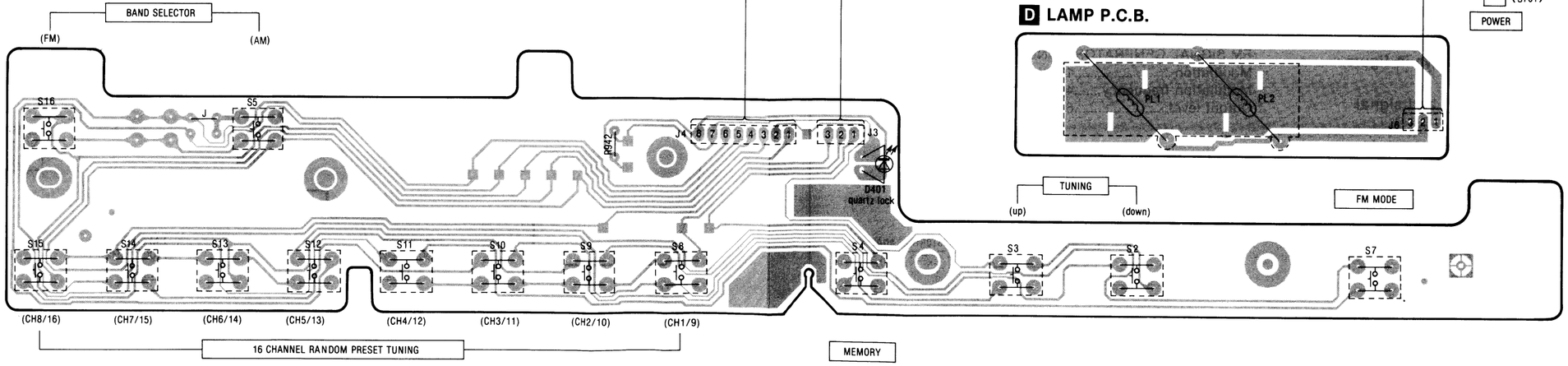
AC 9.3V Supply TP702

AC 9.3V Supply TP701

B MAIN P.C.B.



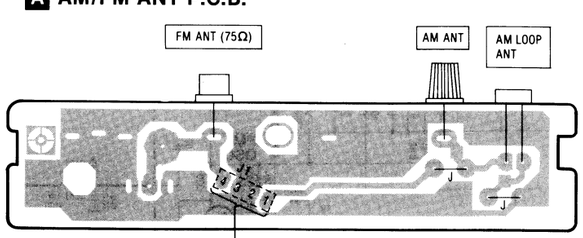
C SWITCH/LED P.C.B.



D LAMP P.C.B.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (ST-X33L)

A AM/FM ANT P.C.B.



INPUT/OUTPUT CONNECTOR (To Amplifier)

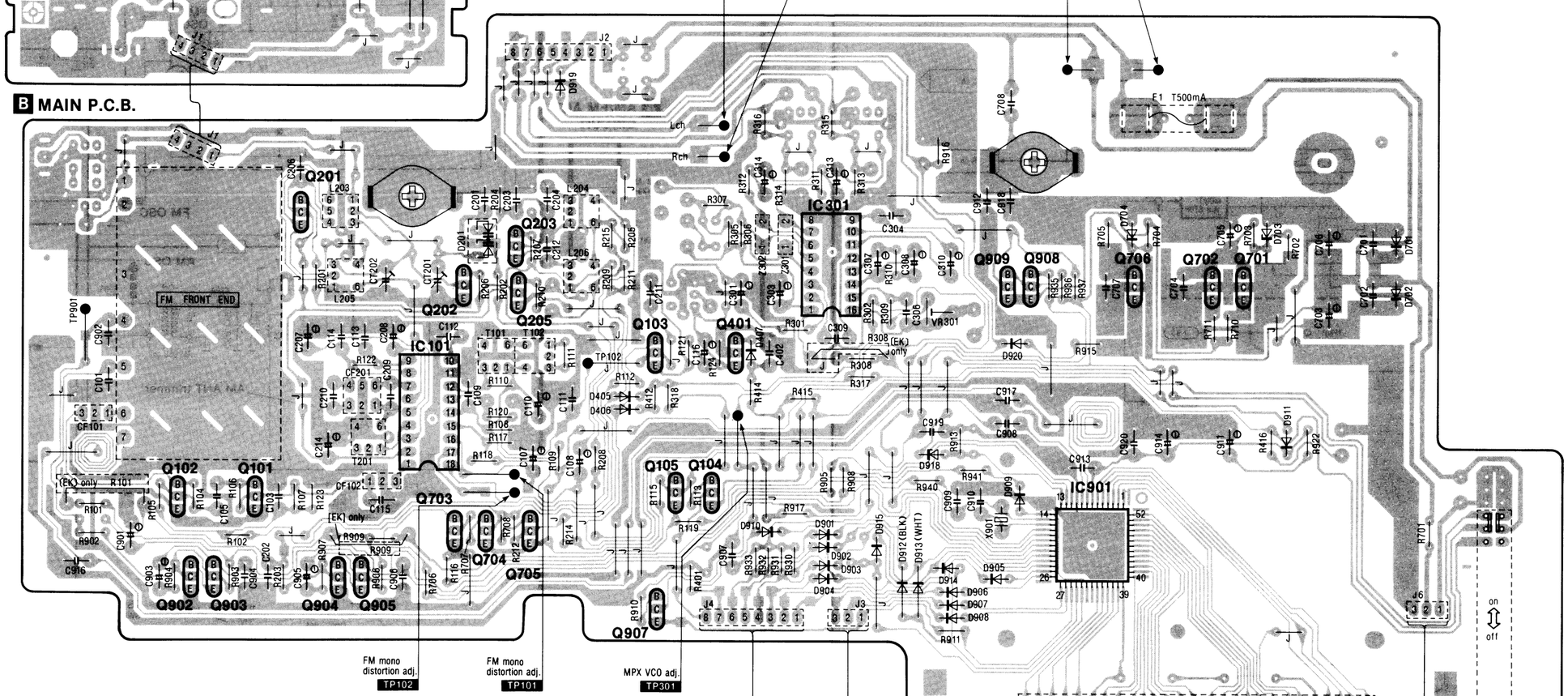
Lch Output TP303

Rch Output TP304

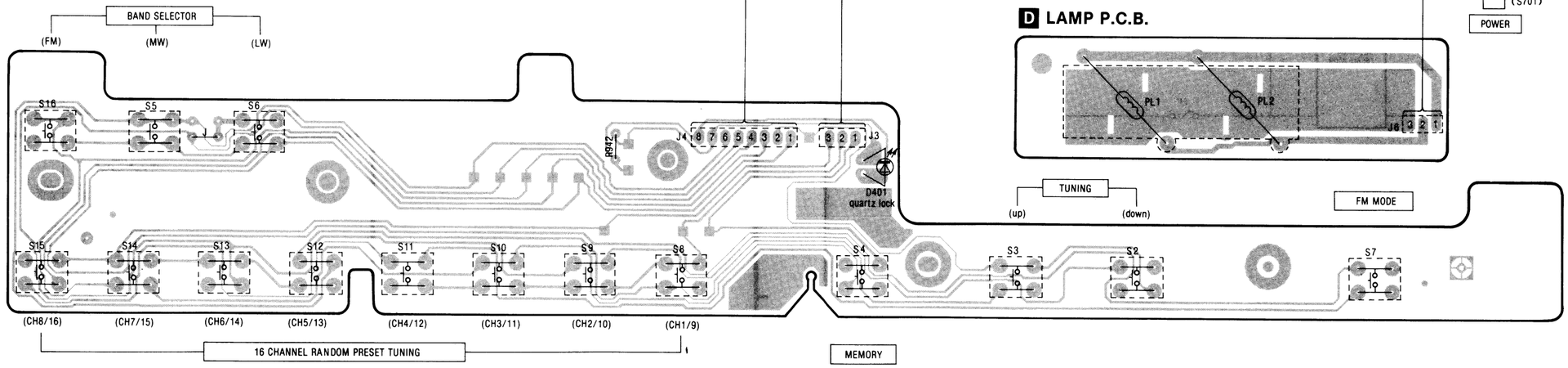
AC 9.3V Supply TP702

AC 9.3V Supply TP701

B MAIN P.C.B.



C SWITCH/LED P.C.B.



D LAMP P.C.B.

■ RESISTO

Notes: • Part num
Please us
• Important
Compone
teristics
these co
parts.

Numbering Sys

Example

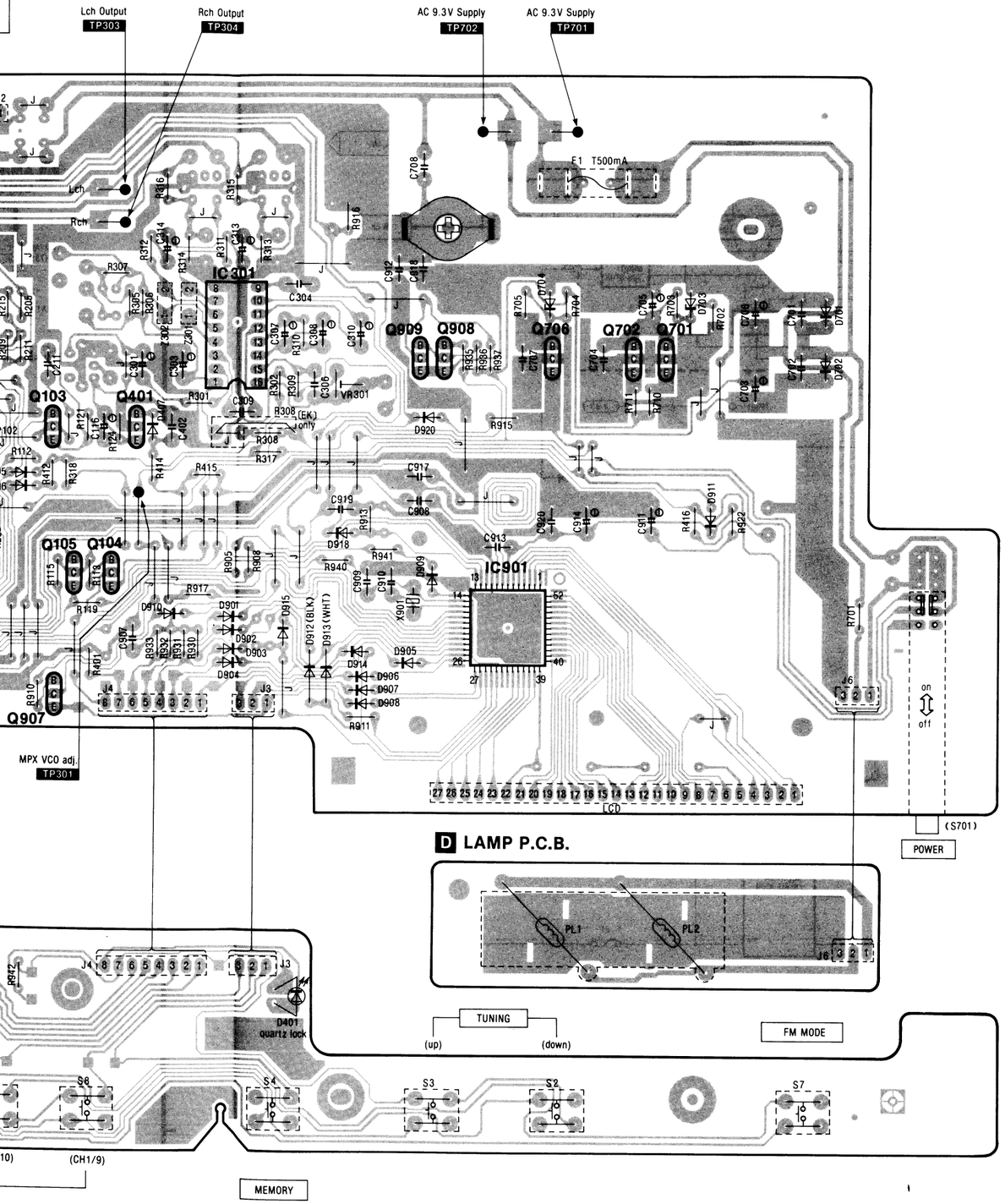
ERD	25	F
Type	Wattage	Shap

Resistor Type	
ERD	: Carbon
ERC	: Solid
ERO	: Metal Film

● RESISTORS

Ref. No.	Part N
R101 [EK]	ERG1ANJ
R101 [Other]	ERDS2TJ
R102	ERDS2TJ
R104	ERDS2TJ
R105	ERDS2TJ
R106	ERDS2TJ
R107	ERDS2TJ
R108	ERDS2TJ
R109	ERDS2TJ
R110	ERDS2TJ
R111	ERDS2TJ
R112	ERDS2TJ
R113	ERDS2TJ
R115	ERDS2TJ
R116	ERDS2TJ
R117	ERDS2TJ
R118	ERDS2TJ
R119	ERDS2TJ
R120	ERDS2TJ
R121	ERDS2TJ
R122	ERDS2TJ
R123	ERDS2TJ
R124	ERDS2TJ
R201	ERDS2TJ
R202	ERDS2TJ
R203	ERDS2TJ
R204	ERDS2TJ
R205	ERDS2TJ
R206	ERDS2TJ
R207	ERDS2TJ
R208	ERDS2TJ
R209	ERDS2TJ
R210	ERDS2TJ
R211	ERDS2TJ
R212	ERDS2TJ
R214	ERDS2TJ
R215	ERDS2TJ
R301	ERDS2TJ
R302	ERDS2TJ
R305, 306	ERDS2TJ
R307	ERDS2TJ
R308 [EK]	ERG1ANJ
R308 [Other]	ERDS2TJ
R309	ERDS2TJ
R310	ERDS2TJ
R311, 312	ERDS2TJ
R313, 314	ERDS2TJ
R315, 316	ERDS2TJ
R317	ERDS2TJ
R318	ERDS2TJ
R401	ERDS2TJ
R412	ERDS2TJ
R414	ERDS2TJ
R415	ERDS2TJ

RAM (ST-X33L)



■ RESISTORS AND CAPACITORS

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- The unit of resistance is OHM (Ω). K=1000Ω, M=1000kΩ
- The unit of capacitance is MICROFARAD (μF). P=10⁻⁶μF.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type		Wattage		Tolerance	
ERD	: Carbon	25	: 1/4W	F	: ±1%
ERC	: Solid	S2	: 1/4W	J	: ±5%
ERO	: Metal Film	S1	: 1/2W	K	: ±1%
		12	: 1/2W		

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type		Voltage				Tolerance	
		ECEA Type		Other			
ECEA	: Electrolytic	0J	: 6.3V	1H	: 50V DC	C	: ±0.25pF
ECCD	: Ceramic	1A	: 10V	1	: 125V DC	G	: ±2%
ECKD	: Ceramic	1C	: 16V	KC	: 400V AC	J	: ±5%
ECQM	: Polyester	1E	: 25V			K	: ±10%
ECQP	: Polypropylene	1H	: 50V			Z	: +80%, −20%
		1V	: 35V				
		25	: 25V				

● RESISTORS

Ref. No.	Part No.	Value
R101 [EK]	ERG1ANJ151	150
R101 [Other]	ERDS2TJ151	150
R102	ERDS2TJ152	1.5K
R104	ERDS2TJ474	470K
R105	ERDS2TJ122	1.2K
R106	ERDS2TJ824	820K
R107	ERDS2TJ271	270
R108	ERDS2TJ102	1K
R109	ERDS2TJ471	470
R110	ERDS2TJ822	8.2K
R111	ERDS2TJ222	2.2K
R112	ERDS2TJ224	220K
R113	ERDS2TJ333	33K
R115	ERDS2TJ473	47K
R116	ERDS2TJ471	470
R117	ERDS2TJ332	3.3K
R118	ERDS2TJ103	10K
R119	ERDS2TJ392	3.9K
R120	ERDS2TJ561	560
R121	ERDS2TJ123	12K
R122	ERDS2TJ103	10K
R123	ERDS2TJ182	1.8K
R124	ERDS2TJ224	220K
R201	ERDS2TJ223	22K
R202	ERDS2TJ822	8.2K
R203	ERDS2TJ102	1K
R204	ERDS2TJ104	100K
R205	ERDS2TJ102	1K
R206	ERDS2TJ182	1.8K
R207	ERDS2TJ223	22K
R208	ERDS2TJ222	2.2K
R209	ERDS2TJ122	1.2K
R210	ERDS2TJ473	47K
R211	ERDS2TJ122	1.2K
R212	ERDS2TJ183	18K
R214	ERDS2TJ824	820K
R215	ERDS2TJ102	1K
R301	ERDS2TJ273	27K
R302	ERDS2TJ103	10K
R305, 306	ERDS2TJ223	22K
R307	ERDS2TJ274	270K
R308 [EK]	ERG1ANJ151	150
R308 [Other]	ERDS2TJ151	150
R309	ERDS2TJ153	15K
R310	ERDS2TJ102	1K
R311, 312	ERDS2TJ272	2.7K
R313, 314	ERDS2TJ104	100K
R315, 316	ERDS2TJ331	330
R317	ERDS2TJ103	10K
R318	ERDS2TJ154	150K
R401	ERDS2TJ271	270
R412	ERDS2TJ104	100K
R414	ERDS2TJ222	2.2K
R415	ERDS2TJ472	4.7K
R416	ERDS2TJ222	2.2K
R701	ERDS2TJ1R5	1.5
R702	ERDS2TJ681	680
R703	ERDS2TJ221	220
R704	ERDS2TJ332	3.3K
R705	ERDS2TJ221	220
R706	ERDS2TJ104	100K
R707	ERDS2TJ103	10K
R708	ERDS2TJ473	47K
R710, 711	ERDS2TJ3R9	3.9
R902	ERDS2TJ562	5.6K
R903	ERDS2TJ103	10K
R904	ERDS2TJ561	560
R905	ERDS2TJ102	1K
R906	ERDS2TJ153	15K
R907	ERDS2TJ332	3.3K
R908	ERDS2TJ102	1K
R909 [EK]	ERG1ANJ151	150
R909 [Other]	ERDS2TJ151	150
R910	ERDS2TJ224	220K
R911	ERDS2TJ152	1.5K
R913	ERDS2TJ103	10K
R915	ERDS2TJ103	10K
R916	ERDS2TJ104	100K
R917	ERDS2TJ102	1K
R922	ERDS2TJ681	680
R930, 931	ERDS2TJ824	820K
R932, 933	ERDS2TJ824	820K
R935	ERDS2TJ223	22K
R936	ERDS2TJ104	100K
R937	ERDS2TJ103	10K
R940	ERDS2TJ104	100K
R941	ERDS2TJ271	270
R942	ERDS2TJ333	33K

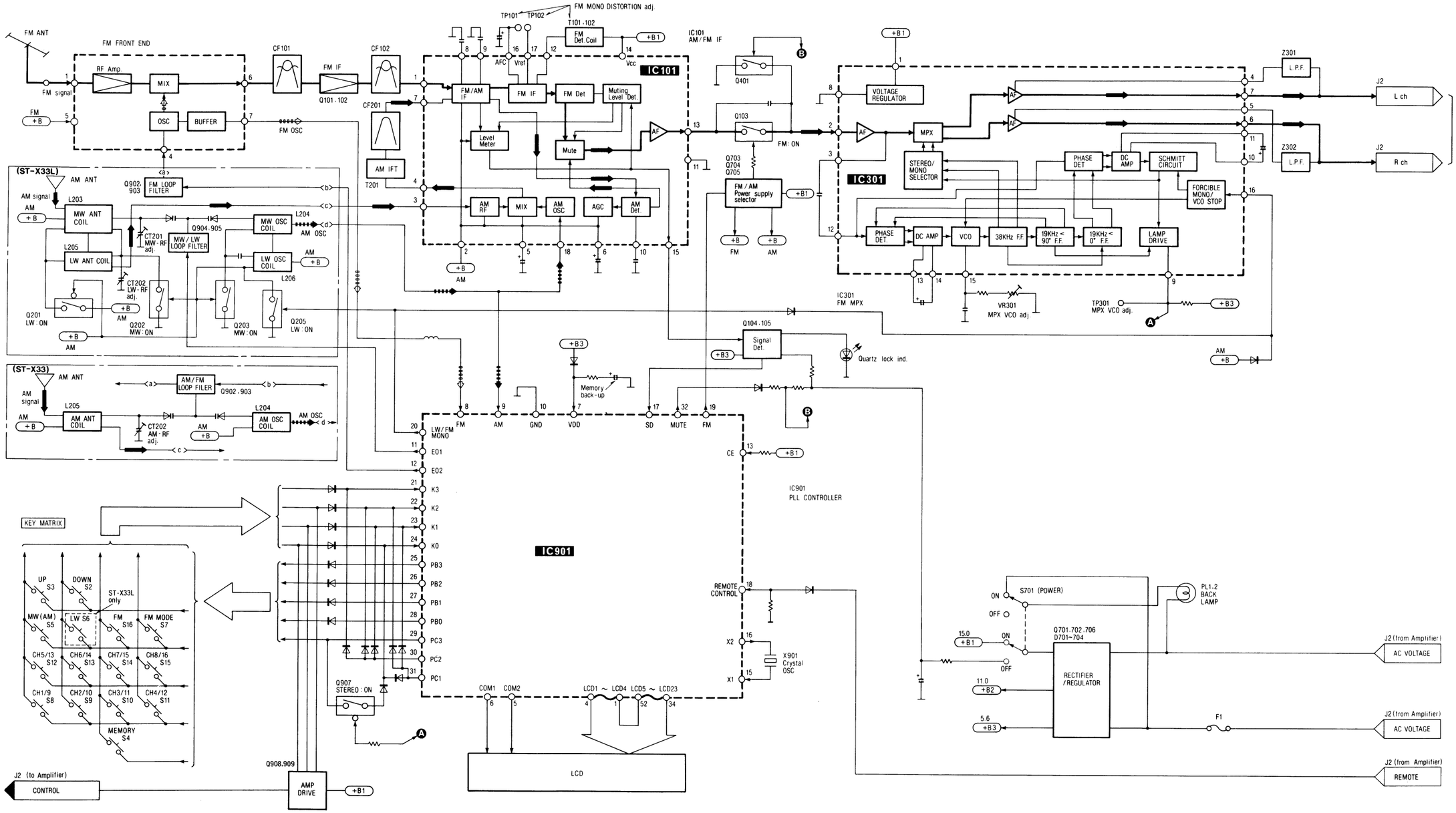
● CAPACITORS

Ref. No.	Part No.	Value
C101	ECKD1H103ZF	0.01
C103	ECKD1H103ZF	0.01
C105	ECCD1H470K	47P
C107	ECEA1HU010	1
C108	ECEA1HUR47	0.47
C109	ECKD1H103ZF	0.01
C110	ECEA1CU100	10
C111	ECCD1H101K	100P
C112, 113	ECKD1H223ZF	0.022
C114	ECKD1H103ZF	0.01
C115	ECCD1H220KC	22P
C116	ECEA1HU2R2	2.2
C201	ECFTD473KXL	0.047
C202	ECKD1H223ZF	0.022
C203	ECCD1H180KC	18P
C204	ECQP1471J	470P
C206	ECKD1H223ZF	0.022
C207	ECEA0JU101	100
C208	ECEA1HU3R3	3.3
C209	ECCD1H080CC	8P
C210	ECCD1H470K	47P
C211	ECFTD153KXL	0.015
C212	ECQP1391JZ	390P
C214	ECEA1CU100	10
C301	ECEA1VU4R7	4.7
C303	ECEA1CU101	100
C304	ECKD1H103ZF	0.01
C306	ECQP1471JZ	470P
C307	ECEA1HU010	1
C308	ECEA1HU3R3	3.3
C309	ECFTD473KXL	0.047
C310	ECEA1HUR47	0.47
C313, 314	ECEA1HUR47	0.47
C402	ECKD1H223ZF	0.022
C701, 702	ECKD1H103ZF	0.01
C703	ECEA1CU102	1000
C704	ECKD1H103ZF	0.01
C705	ECEA1CU101	100
C706	ECEA1CU102	1000
C707, 708	ECKD1H103ZF	0.01
C901	ECEA1CU330	33
C902	ECKD1H223ZF	0.022
C903	ECEA25M4R7R	4.7
C904	ECKD1H103ZF	0.01
C905	ECEA1HU010	1
C906	ECKD1H223ZF	0.022
C907, 908	ECKD1H103ZF	0.01
C909	ECCD1H470K	47P
C910	ECCD1H100KC	10P
C911	ECEA0JU332	3300
C912, 913	ECKD1H103ZF	0.01
C914	ECEA0JU102	1000
C916	ECCD1H100KC	10P
C917	ECCD1H080CC	8P
C918	ECKD1H103ZF	0.01
C919, 920	ECKD1H102ZF	0.001

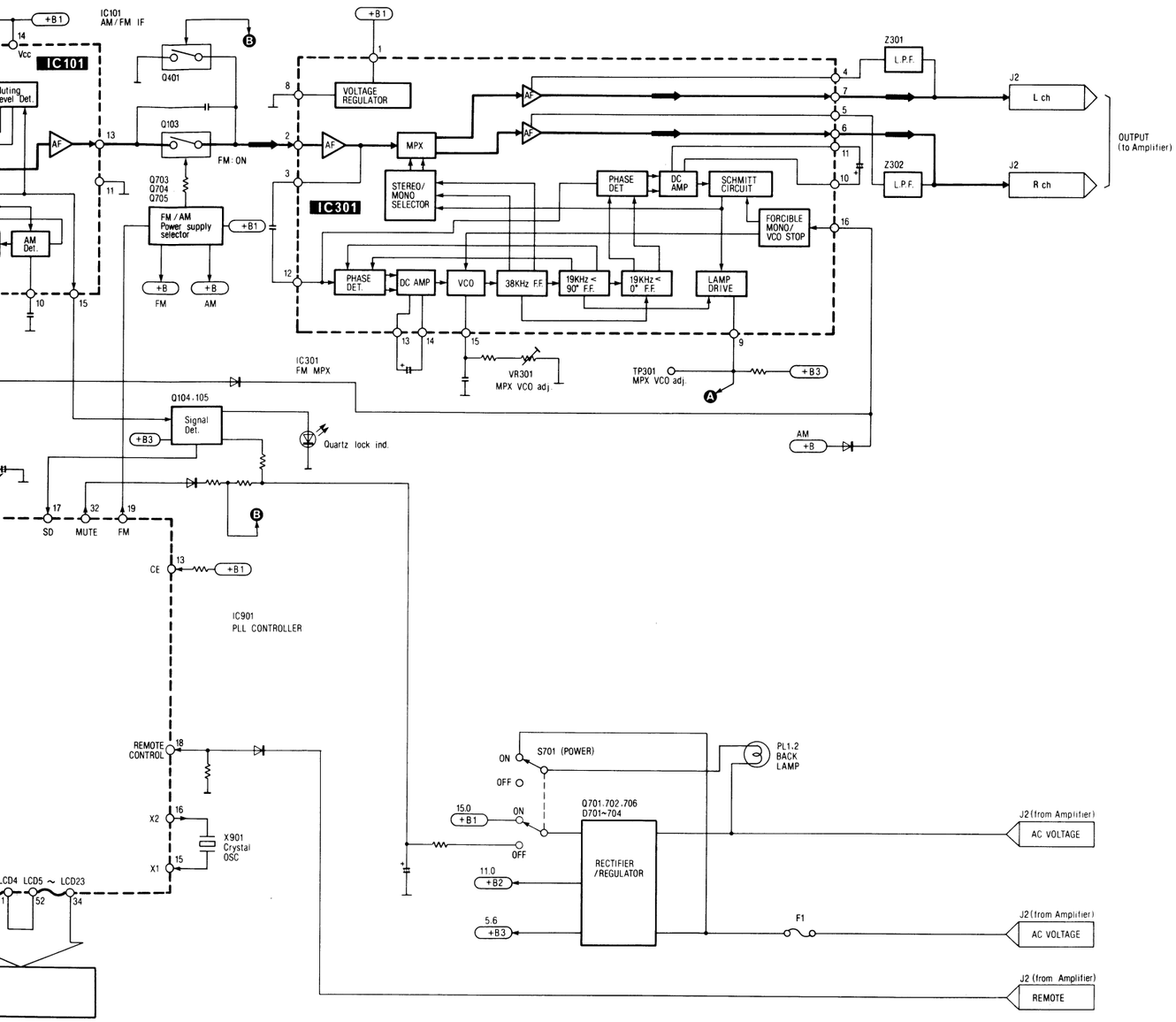
● Change of Parts List (ST-X33 from ST-X33L)

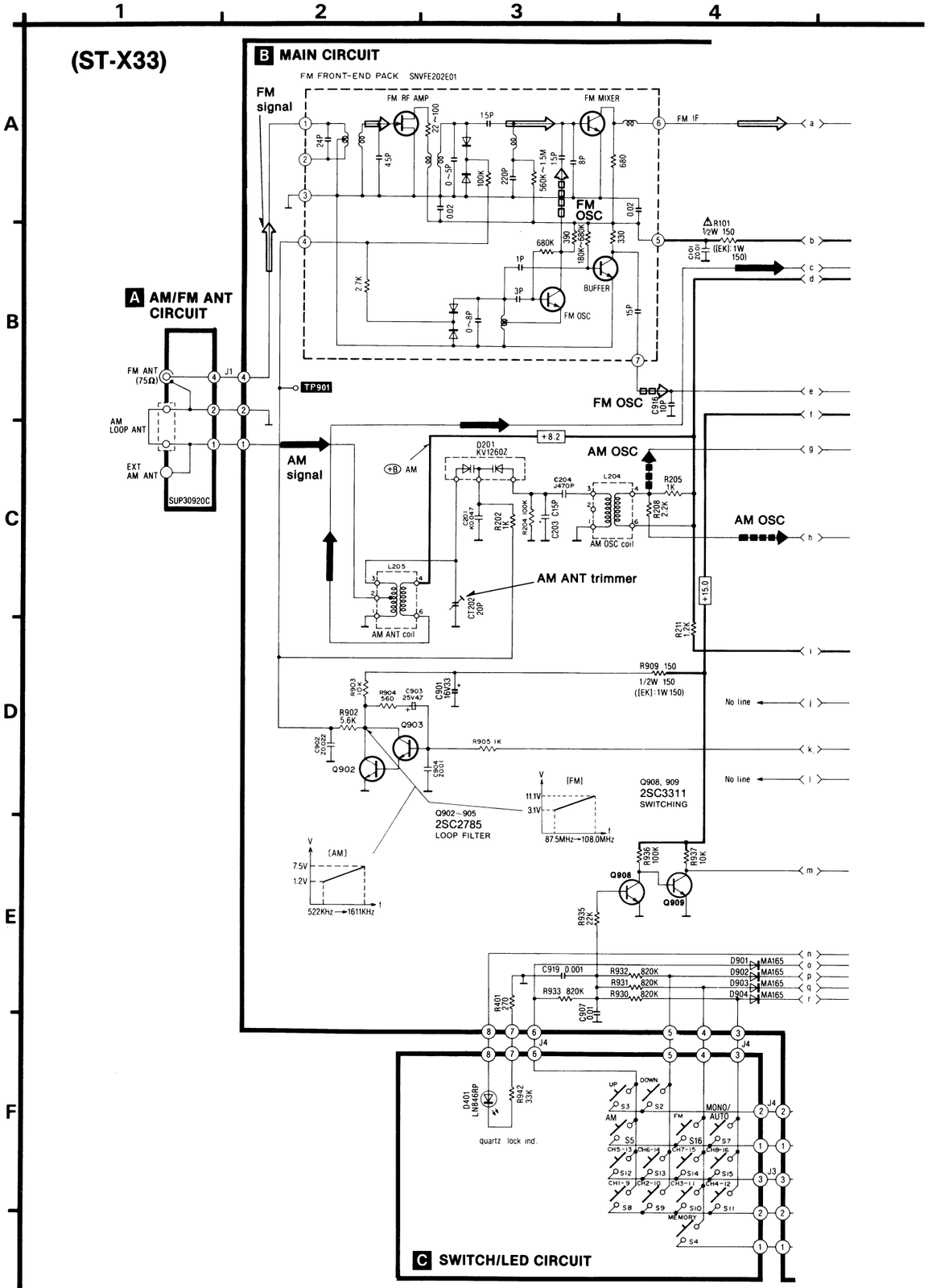
Ref. No.	Change of Part No. ST-X33L [EK] ➡ ST-X33 [XA, XL, PC]		Description
RESISTORS			
R101	ERG1ANJ151	ERDS2TJ151	150Ω
R201	ERDS2TJ223	———	(Deletion)
R202	ERDS2TJ822	ERDS2TJ102	1kΩ
R203	ERDS2TJ102	———	(Deletion)
R206	ERDS2TJ182	———	(Deletion)
R207	ERDS2TJ223	———	(Deletion)
R209	ERDS2TJ122	———	(Deletion)
R210	ERDS2TJ473	———	(Deletion)
R215	ERDS2TJ102	———	(Deletion)
R308	ERG1ANJ151	ERDS2TJ151	150Ω
R906	ERDS2TJ153	———	(Deletion)
R907	ERDS2TJ332	———	(Deletion)
R908	ERDS2TJ102	———	(Deletion)
R909	ERG1ANJ151	ERDS2TJ151	150Ω
CAPACITORS			
C202	ECKD1H223ZF	———	(Deletion)
C203	ECCD1H180KC	ECCD1H150KC	15pF
C212	ECQP1391JZ	———	(Deletion)
C905	ECEA1HU010	———	(Deletion)
C906	ECKD1H223ZF	———	(Deletion)

■ BLOCK DIAGRAM



STORTION adj.





(ST-X33L)

B MAIN CIRCUIT

FM FRONT-END PACK SNVFE202E01

A AM/FM ANT CIRCUIT

FM ANT (75Ω) J1
AM LOOP ANT
EXT AM ANT

FM signal
FM RF AMP
FM MIXER
FM IF
FM OSC
BUFFER
FM OSC

Q101, 102 2SC2787L FM IF AMP

IC101 AN7273B FM IF DET. & AM CON

Q103, 401 2SC3311 "WITCHING

Q401 MA29WA

IC301 AN7470 FM MPX

MPX VCO adj.

FM AF signal (Lch)
FM AF signal (Rch)

FM off set voltage (0mV)

Q703 2SC3311 SWITCHING

Q704,705 2SA1309A SWITCHING

Q104 2SA1309 SIGNAL IND. DRIVE

Q105 2SC3311 SIGNAL IND. DRIVE

FM DET coil

MW ANT trimmer

Q201 2SA1309 SWITCHING

AM signal

AM OSC

MW ANT coil
MW OSC coil
LW ANT coil
LW OSC coil

Q202, 203 2SC3311 SWITCHING

Q205 2SC3311 MW/LW SELECTOR

LW ANT trimmer

Q902~905 2SC2785 LOOP FILTER

Q908, 909 2SC3311 SWITCHING

[MW] 522KHz→1611KHz
[LW] 155KHz→353KHz
[FM] 87.5MHz→108.0MHz

Memory back-up

AM OSC

Except [XA]
ST-X33L only

Q907 2SA1309A SWITCHING

Refer to Note 2

IC901 μPD1718G514 PLL CONTROLLER

"H" with FM mono.

Q701, 702, 706 2SC1685 REGULATOR

S701 (POWER)

D401 LN846RP
quartz lock ind.

C SWITCH/LED CIRCUIT

D LAMP CIRCUIT

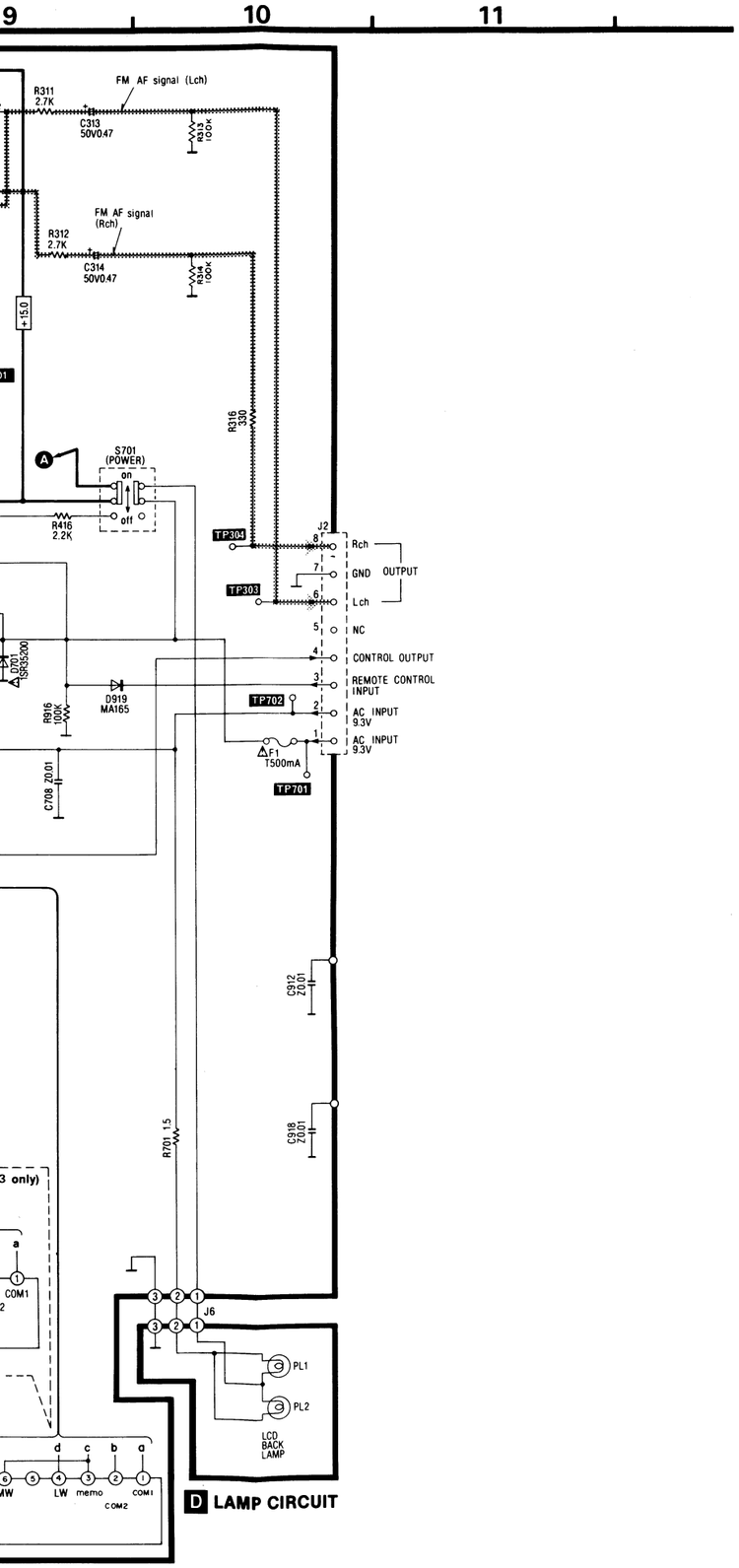
Liquid Crystal Display (LCD)

(ST-X33 only)

Rch
GND
Lch
NC
CONTROL
REMOTE CONTROL INPUT
AC INPUT 9.3V
AC INPUT 9.3V

F1 T500mA

PL1
PL2
LCD BACK LAMP



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- **S2** : Tuning (down) switch.
  [down: tuning to lower frequency]
- **S3** : Tuning (up) switch.
  [up: tuning to higher frequency]
- **S4** : Memory set switch. (manual ↔ auto memory)
- **S5 (ST-X33)** : AM select switch.
  (ST-X33L) : MW select switch.
- **S6 (ST-X33L only)** : LW select switch.
- **S7** : FM mode switch. (stereo ↔ mono)
- **S8～S15** : Preset tuning switch.
  * With it momentarily pushed (less than 0.4 sec.) and released, the 1～8 CH are received.
  * With it continuously pushed (0.4 sec. or more) and released, the 9～16 CH are received.
- **S16** : FM select switch.
- **S701** : Power switch in "on" position.
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  All voltage values shown in circuitry are DC voltage in FM signal (no signal) reception modes.
  * Figures in ≺ ≻ stand for DC voltage in FM stereo signal reception mode.
  * Figures in ( ) stand for DC voltage in AM signal reception mode.
  * Figures in ⌈ ⌋ stand for DC voltage in LW signal reception mode.
  * Figures in ▭ stand for muting mode.

  Positive voltage lines — AF signal lines
  FM OSC — FM signal
  AM OSC — AM signal
- Important safety notice.
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.

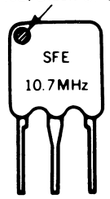
Part No.	Original Part No.	Supply Part No.
IC301	AN7470	SVIUPC1161C3
D912, 913	MA150	MA162A

Note 2:

- **Use of ceramic filters in pairs**

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three versions. For this circuit, be sure to use the ceramics of the same version in a pair.
At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each version of the ceramic filters.

Color marking
(Red, Black or White)



VERSION (Color)	D912	D913	CENTER FREQUENCY
Black	○	×	10.65MHz
Red	×	×	10.70MHz
White	×	○	10.75MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

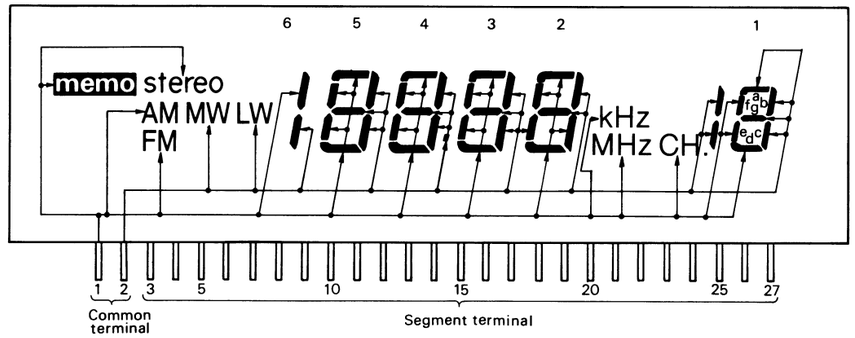
* Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

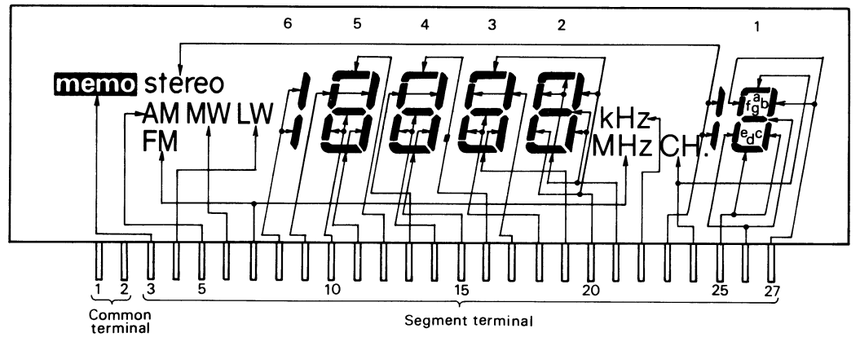
- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ DESCRIPTION OF LCD PANEL

• COMMON



• SEGMENT

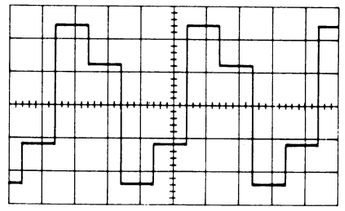


No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
COM1	COM1	—	MEMO	—	AM	—	FM, MHz	6b	5f	5e	5d	5a	4f	4e	4d
COM2	—	COM2	—	LW	—	MW	—	6c	5b	5g	5c	—	4b	4g	4c

No.	16	17	18	19	20	21	22	23	24	25	26	27
COM1	4a	3f	3e	3d	3a	2acdf	kHz	stereo	CH	1d	1e	1f
COM2	▰	3b	3g	3c	2be	2g	—	▰	1a	1c	1g	1b

< Segment ON >

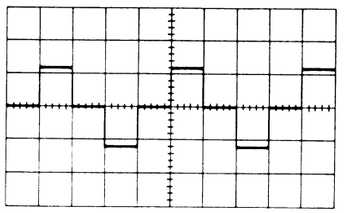
Pin ① or ② of LCD and each segment terminal.



2V AC/DIV, 5m sec/cm

< Segment OFF >

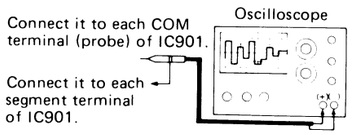
Pin ① or ② of LCD and each segment terminal.



2V AC/DIV, 5m sec/cm

- **Each segment waveform measuring method**

Note: Potential difference from COM terminal waveform is measured for each segment output waveform.
Do not ground with other equipment on the oscilloscope or IC901 will fail.



■ REPLACEMENT PARTS LIST

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
- The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7273A	IC
IC301	SVIUPC1161C3	IC
IC901	UPD1718G514	IC
TRANSISTORS		
Q101, 102	2SC2787L	Transistor
Q103, 105, 202, 203, 205, 401, 703, 908, 909	2SC3311−Q	Transistor
Q104, 201, 704, 705, 907	2SA1309Q	Transistor
Q701, 702, 706	2SC1685−QNC	Transistor
Q902∼905	2SC2785F	Transistor
DIODES		
D201	KV1260Z	Diode
D401	LN846RP−C	L.E.D.
D405, 406, 901∼911, 914∼916, 919	MA165	Diode
D407, 920	MA29WA	Diode
D701, 702 ⚠	1SR35200	Rectifier
D703	MA4150M	Diode
D704	MA4062−M	Diode
D912, 913	MA162A	Diode
D918	MA4100M	Diode
COILS		
L203	SLA2B3−P	AM Antenna
L204	SLO2B9R−P	AM OSC
L205	SLA1B7R−P	LW Antenna
L206	SLO1B5−P	LW OSC
TRANSFORMERS		
T101	SLI4B511−Z	FM IFT
T102	SLI4B513−Z	FM IFT
T201	SLI2B101−M	AM IFT
CERAMIC FILTERS		
CF101, 102	SVFE107MS2−A	FM, 10.7MHz (Red)
	SVFE107MS2−D	FM, 10.65MHz (Black)
	SVFE107MS2−E	FM, 10.75MHz (White)
CF201	SVFSFZ450F7L	AM, 450kHz
CRYSTAL		
X901	SVQ43U452−D	4.5MHz

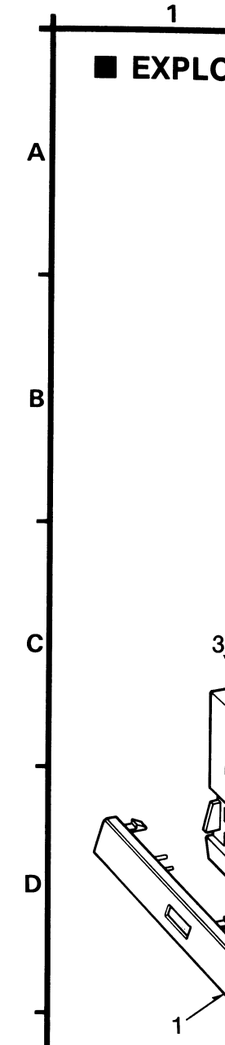
Ref. No.	Part No.	Description
VARIABLE RESISTOR		
VR301	QVNB3A00B472	MPX VCO 4.7kΩ
VARIABLE CAPACITORS		
CT201	ECRHA010A41	Trimmer
CT202	ECRHA020D41	Trimmer
LAMP		
PL1, 2	XAMS20Q8	
FUSES		
F1 [EK]	⚠ XBA2C05TB0	250V, T500mA
F1 [Other]	⚠ XBA2C05TR0	250V, T500mA
COMPONENT COMBINATIONS		
Z301, 302	EXRP181K473T	180pF, 47kΩ
SWITCHES		
S2∼16	SSG13	Preset
S701	⚠ SSH1217	Power Source
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9311	
FM FRONT END		
	SNVFE202E01	FM RF Pack

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SGX7787−1A	Ornament	(1)
2	SGX7788B	Ornament	(1)
3 [EK]	SGYTX33L−KK	Front Panel Ass'y	(1)
3 [Ohter]	SGYTX33L−KE	Front Panel Ass'y	(1)
3−1	SGU490B	Transparent Plate	(1)
4	SBC761−1A	Button, Preset	(1)
5	SBC764−1	Button, Tuning	(1)
6	SBC807−2	Power, Button	(1)
8	SBC762−2B	Button	(1)
9	SHR9787	LCD Spacer	(1)
10	SDU286B	Filter	(1)

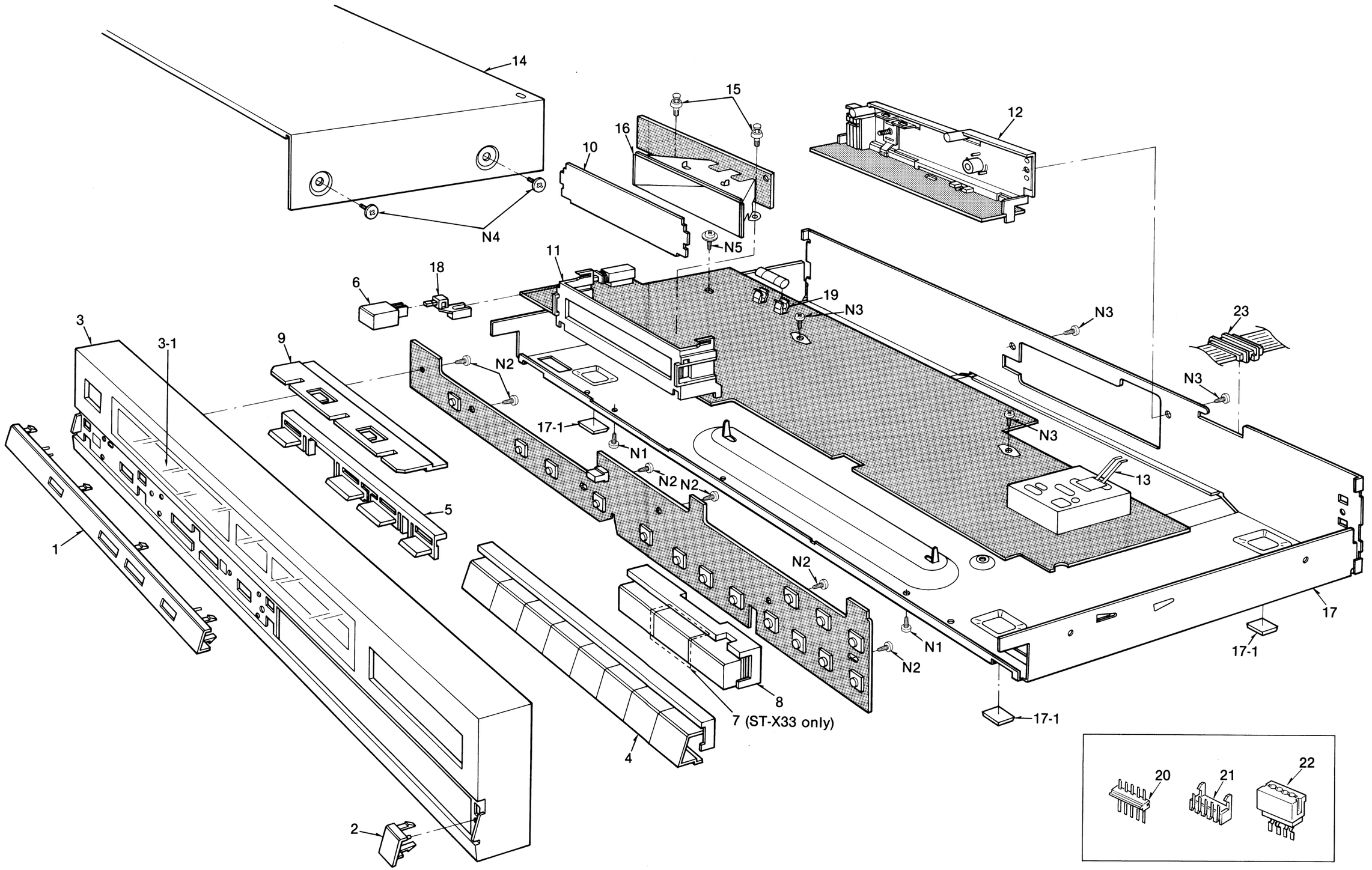
Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
11	SHR9786	Holder, LCD	(1)
12	SJF8302N	Terminal Board	(1)
13	SUS803	Spring, Ground	(1)
14	SKC1700K994	Cabinet	(1)
15	SHR415	Nylon Pin	(2)
16	SMP401	Lamp Case	(1)
17 [EK]	SGPTX33L−KK	Chassis Ass'y	(1)
17 [Other]	SGPTX33L−KE	Chassis Ass'y	(1)
17−1	SKL297−1	Foot	(4)
18	SUB260	Connection Rod	(1)
19	SJT347	Fuse Holder	(2)
20	SJT3311	Terminal (3P), (J6)	(1)
21	SJS5341	Socket (3P), (J6)	(1)
22	SJT30343−V	Socket (3P), (J3)	(1)
22	SJT30843−V	Socket (8P), (J4)	(1)
23	SWK1663	Cord	(1)
SCREWS			
N1	XTB3+8JFZ	Tapping, ⊕3×8	(2)
N2	XTB3+8G	Tapping, ⊕3×8	(6)
N3	XTBS3+8JFZ1	Tapping, ⊕3×8	(4)
N4	SNE2095−5	Cabinet	(4)
N5	XTW3+8T	Tapping, ⊕3×8	(1)
ACCESSORIES			
A1	SSA270	FM Antenna Cord	(1)
A2	SPB1139	Loop Antenna	(1)
A3	SGETX33L−KE1	Bracket, Left	(1)
A4	SGETX33L−KE2	Bracket, Right	(1)
PACKING PARTS			
P1 [EF]	SPG5696	Carton Box	(1)
P1 [EK]	SPG5697	Carton Box	(1)
P1 [Other]	SPG5695	Carton Box	(1)
P2	SPS4655−1	Pad, Left Side	(1)
P3	SPS4656−1	Pad, Right Side	(1)
P4	SPS4663	Pad, Up Side	(1)
P5	SPS3987	Pad, Down Side	(1)
P6	SPP741	Polyethylene Bag	(1)
P7	XZB16X25A02	Polyethylene Bag	(2)

● Change of Parts List (ST-X33 from ST-X33L)

Ref. No.	Change of Part No. ST-X33L [EK]	➡ ST-X33 [XA, XL, PC]	Part Name & Description	Pcs/Set	Remarks
TRANSISTORS					
Q202, 203, 205	2SC3311−Q	———	———	—	(Deletion)
Q201	2SA1309−Q	———	———	—	(Deletion)
Q904, 905	2SC2785F	———	———	—	(Deletion)
DIODES					
D914	MA165	———	[XA] only ———	—	(Deletion)
		MA165	[Other] Diode	(1)	(Addition)
D915	MA165	———	———	—	(Deletion)
D916	MA165	MA165	[XA] only Diode	(1)	
		———	[Other] ———	—	(Deletion)
COILS					
L203	SLA2B3−P	———	———	—	(Deletion)
L204	SLO2B9R−P	SLA2B7−M	AM OSC Coil	(1)	
L205	SLA1B7R−P	SLA2B1−M	AM Antenna Coil	(1)	
L206	SLO1B5−P	———	———	—	(Deletion)
VARIABLE CAPASITORS					
CT201	ECRHA010A41	———	———	—	(Deletion)
CT202	ECRHA020D41	ECRHA010A41	AM Antenna trimmer	(1)	
FUSE					
Fi	XBA2C05TB0	XBA2C05TR0	250V, T500mA	(1)	⚠
SWITCH					
S6	SSG13	———	———	—	(Deletion)
CABINET and CHASSIS PARTS					
3	SGYTX33L−KK	SGYTX33−KX	Front Panel Ass'y	(1)	
7	———	SGX7851	Ornament	(1)	(Addition)
8	SBC762−2B	SBC762−3B	Button	(1)	
15	SJF8302N	SJF8401N	Terminal Board	(1)	
17	SGPTX33L−KK	SGPTX33−KX	Chassis Ass'y	(1)	
ACCESSORY					
A2	SSA270	SSA269	FM Antenna Cord	(1)	
PACKING PARTS					
P1	SPG5697	SPG5698	Carton Box	(1)	
P8	———	SPB1061	Polyethylene Bag	(1)	(Addition)



■ EXPLODED VIEW



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